

• COMPUTERWORLD

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Detroit Finds More Holes in Its Primary Vote

By Thomas Morton

CW Midwest Bureau

DETROIT — As the time for the general election in November draws nearer, more and more irregularities with the punched card August primary are being brought to the fore. Many of Detroit's troubles seem to have been caused, directly or indirectly, by the punched cards themselves.

A programmer told CW that one of the big problems "was that the chads kept coming out all by themselves."

"I ran a test on a card that had not been

used in the election," an accuracy observer board member said.

"I first ran the unpunched card," he explained, "over the edge of a desk as if I were trying to unbend it. Then I ran it through a card reader. Even though no one had punched it, that card had 40 holes in it." Then he added, "40 holes would mean 40 extra votes — or the complete vote being thrown out."

When the board of canvassers was hand counting the votes from the 103 precincts

reporting discrepancies, confetti-like chads were seen on the counting table.

"Our people were handling the ballots a lot more gingerly than the guys running the computers at the counting centers," canvasser Emmet Tracy said.

While one board member felt that the partly perforated punched cards were not reliable enough to withstand the rigors of handling and processing without causing mistakes or "overvotes," Ralph Fryzelka, an official Republican chal-

lenger who observed the counting procedure at the Chrysler Corp. Lynch Road Computer Center during the August primary, said he had a photograph allegedly showing precinct workers manually removing loose chads from voted ballots.

That action, according to Fryzelka, violated Michigan state law.

Removal of Chads

If the chads are not cleanly punched out

(Continued on Page 5)



Typical configuration of single-processor Burroughs B6700 system. Multiple processor models are scheduled for December delivery.

B700 Systems Compatible, Offer Multiple Processors

By Frank Piasta

CW Staff Writer

NEW YORK — Burroughs introduced a family of systems here last week that will be the successor to its current B5500 and up computers.

The B700 series was unveiled with the announcement of three models, B5700, B6700, and B7700 which compare with the three announced models of the IBM 370 series and with the top end of the 360 line on a price/performance basis.

Burroughs also introduced a

disk pack storage system, the B9484, similar in performance but lower in price than the IBM 3330, and an expanded head-per-track disk drive, the B9472, for use with the company's optimized access memory banks, which queue randomly accessed data.

Including the B5700, with one or two processors, and the B6700, which can accommodate up to three processors, the B700 series is intended to appeal to those users who might be considering the 370 models 145,

155, and 165.

The most powerful system, the B7700, represents a new high in power for Burroughs systems. Able to accommodate as many as eight processors and up to 6 million bytes of memory, the system probably will attract users of the IBM 360/85 and 195.

Users of current Burroughs B500 equipment were not forgotten. Programming is entirely in compiler languages: Fortran, Cobol, Algol, PL/I, and Basic. The company said that the new family is source language compatible with the B500 series, necessitating only recompilation and no reprogramming.

Master Control Program

The B500's Master Control Program (MCP) has been enhanced for the B700 series and should present few, if any conversion problems. The MCP combines with the B700 series architecture in which independent CPUs, memory, and I/O elements interact through a central exchange to make multiprogramming and multiprocessing possible.

Other significant aspects of the systems include: programmer-independent memory through automatic program segmentation; memory allocation and reentrant code; an enhanced data

(Continued on Page 4)

Scan-Data OCR Unit Can Learn Any Font

By Don Leavitt

CW Staff Writer

NORRISTOWN, Pa. — Users can now process both printed pages and cards through the same OCR hardware reader, and can teach the system to accept any font under software control. Both these features are included in the upgraded Scan-Data Model 250/350 OCR Reader System.

The Model 250/350 readers are upgraded versions of the pre-

viously available Model 200/300 page readers. The readers have been modified to accept documents as small as punched cards, and pages as large as 11 in. by 14 in. As with the previous models, the 250/350s include hardwired capabilities of recognizing up to 400 characters, in a user-designated mix of fonts.

Beyond the recognition capabilities, however, lies what Scan-Data considers the heart of its system. The Software Aided

Multifont Input (Swami) program is able to accept and store definitions of new fonts, which are immediately usable to screen input documents.

Once entered, the font definitions are also stored on magnetic tape for later use.

'Self-Teaching'

The Swami program has "self-teaching" capabilities similar to Compuscan's System/370 announced last fall but there are

few other parallels between the two systems.

The Compuscan system handles only microfilm as input, and it has no hardwired recognition for even the standard OCR fonts.

The computer built into the Compuscan is an XDS Sigma 3 and the prices for the system range from \$350,000 or \$400,000 for a basic model to \$900,000 for a full version with all options.

The Scan-Data 250 with four fonts hardwired into the reader, an 8K memory on the CPU, and a 9-channel output tape unit costs \$232,900. The Swami software is included in the system.

Scan-Data said that it expects the system to find its greatest use in operations with stringent timing requirements and massive input, and in operations where turnaround documents can be effectively designed.

In either case, the use of the enhanced OCR system would eliminate the need to transcribe data from source documents.

Built Around PDP-8/i

Built around a DEC PDP-8/i, the Scan-Data system can produce 7- or 9-channel magnetic tape, paper tape, punched cards or printed copy as output, at the operator's option.

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Contest 'Exposes Misuse'

Best Data Sabotage Plan Wins!

By Edward J. Bride

CW Staff Writer

CAMBRIDGE, Mass. — The most effective plan for destroying computerized information will win a cash prize, in a contest in which the winning entries may be presented to national television audiences this fall.

Although sponsors of the contest admit to being concerned over the potential misuse of the blueprints for sabotage, they consider the contest the most effective way to arouse public concern over the misuse of computers, and to deter large organ-

izations from abusing privacy and data banks.

Rules for the contest were advertised in student newspapers at both Harvard and MIT.

The originators, both graduate students of computer science at Harvard, claimed the contest, which ends this week, was a "contribution" to a forthcoming special presentation on National Educational Television. Reportedly scheduled for viewing this fall, the special is tentatively entitled "Privacy and Technology," and will run 90 minutes.

Officials of the local NET sta-

tion in Boston, and NET headquarters in New York, could not confirm the special, noting there might not be any public information available yet, "if it is still a proposal."

Contest sponsors stated NET approached them for a "contribution" last summer, after the press displayed increasing concern over the "serious" issues of privacy and abuse of information.

Computer Billing Troubles

One of the originators, Jerry

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On the Inside

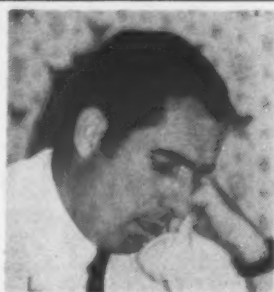
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Depends on Teamwork

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Computers at War

Unique DMA Enters Socio-Political Arena

By Bernice Pantell

Special to Computerworld

SAIGON — There is a unique U.S. military command in Vietnam called the Military Assistance Command Vietnam (MACV) and it has a correspondingly unique computer center, called the Data Management Agency (DMA).

The applications of the DMA read like the front page of the daily newspaper: incident reporting in the Demilitarized Zone for the Paris peace talks; the prisoner of war roster for negotiating releases and control of the Vietcong and North Vietnamese prisoners.

Also, Seer, the evaluation of Vietnam's armed forces for determining progress of Vietnamization; Vietnamization Measurement of Progress (VMOP), a parameter by parameter comparison, with on-line graphs, of the trends of Vietnamization in

the provinces; force and material reporting system (Famrep) used to support the withdrawal of U.S. forces.

When a unit is designated for withdrawal, Famrep itemizes the men, equipment, transportation, tonnage, and other logistical requirements for performing the actual withdrawal.

Political Flavor

It is difficult to separate the military from the political flavor of these applications, and this fact perhaps provides a clue to the uniqueness of MACV. It certainly provides a clue to the significance of the work of this computer center.

The DMA was only an idea in February 1967 when Gen. William Westmoreland gave the go-ahead to build a computer center in MACV.

Given this high-level support, DMA was organized, staffed and

equipped, and was "on the air" by December 1967.

It went from ground zero to production in 10 months. Two years later, there are 132 applications in production or under development, and there isn't one that doesn't have fascinating implications (like Cabots, the currency and black market control system).

360/50 System

A 360/50 computer system works around the clock to provide reports and projections on these sensitive matters which must be current and on which major decisions may depend.

The data base used to provide this support to MACV is enormous. It is updated continuously and generates information that is disseminated worldwide.

Data is transmitted almost instantaneously to Cincpac in Hawaii and to the Joint Chiefs in Washington, via the military Autodin system.

The 360 is a 4-channel, 514K system, with two 2314 disk units, eight tapes, three printers, two reader/punch units, and an on-line 2260 remote terminal. It runs under OS, release number 17, and uses Hasp for spooling.

Core is segmented into five partitions, one (80K) for the remote and the other four for production.

The operator may change the partition assignment as he loads

a job, enabling him to react to other jobs on the schedule.

There is also a CalComp plotter setup, with a 718 flatbed plotter and a 471 digital plotter, and a 360/20 card computer for off-line printing and punching.

Programs are written in Cobol, Fortran, Pl/I, DPS (a file organization language), Nips (National Information Processing Systems Language), and Assembly Language.

DMA is staffed with 28 officers, 61 enlisted men and 20 Vietnamese, plus some 25 contract analyst/programmers and software programmers.

The military personnel are highly trained and experienced in systems, programming and operations. However, their one-year tour of duty tends to reduce the continuity needed to maintain so many highly technical applications. IBM and Computer Sciences Corp. (CSC) provide that continuity under a contractual arrangement, assigning 15 and 10 men respectively, on a full-time basis.

Good Relations

An interesting development at the DMA has been the close and complementary working relationships entered into and sustained by IBM, CSC, and the U.S. military DP personnel.

Military analysts in plans and requirements division originate requirements for new applications.

Contract and military analysts in the analysis and programming division define the system in detail, determine the programming logic, establish the timing and identify the constraints. This final design is taken before a "murder board" where it is subjected to heartless criticism.

Only thoroughly developed systems survive this review. The board is reconstituted for each system, but always contains the military division chiefs and the IBM and CSC contract managers.

Wide Support

The DMA supports other organizations besides MACV. The largest outside user is Cords, another one-of-a-kind U.S. government activity in Vietnam, this one engaged in a pacification program in the provinces that is rather monumental in its undertaking. (The computer system supporting that program will be the subject of a subsequent article.)

There are four other 360/50 systems in Vietnam, as well as over 50 other computer installations of various manufacture.

This unprecedented degree of computerized control over military activities in a war zone is another example of uniqueness in Vietnam.

Ultimately, if this computer competence passes into civilian channels, it could also be a unique U.S. legacy to a country that needs all the help modern technology can provide.

Steps are already being taken in this direction. It is likely that the computer techniques developed by MACV to record and analyze socio-political events will be of great value to postwar Vietnam.

Humanities Department Gets a Computer System?

NOTRE DAME, Ind. — While some students may think computers belong to the engineering and science majors, at Notre Dame, at least, even analyzing a poem is going on-line.

The dean of the College of Arts and Letters here, Dr. Frederick J. Crosson, explained that his department is installing 10 terminals connected to a 360/50, strictly for the use of liberal arts students.

The project is being sponsored by the National Science Foundation.

Crosson stated the four major long-range goals for a computer system in a humanities department:

- Acquaint students with an instrument which is transforming the world they live in.

In line with this goal, the college has opened a new course called "Computer Use for English Majors," which supplements an existing course on "Information Processing for Social and Behavioral Scientists."

The new course explains how the computer can help researchers learn who authored a particular essay (as in determining authorship of the Federalist papers) and determine missing words and phrases in damaged manuscripts (helpful in restoring old works like Beowulf).

Long-Range Goals

- Increase the availability and use of the computer for faculty and graduate students. Such departments as economics, sociology and psychology already place heavy demands on the university's Univac 1107 for evaluating masses of statistics.

- Introduce faculty in the humanities to the computer. Now that the barriers of mathematical terminology and complex programming requirements have been lifted, Crosson hopes faculty in English and history will use the computer to handle a

variety of routine tasks.

For instance, he explained, history researchers could use the computer to sort through masses of data, such as shipping logs and tax records, to discern general trends in trade and economy.

Radical Rumblings Heeded, Centers Increase Security

CW Midwest Bureau

CHICAGO — As awareness of the possible dangers of bombings, arson, and sabotage mounts in the Midwest data processing community, the area's superintendents and managers are beginning to take steps to add more security to their operations.

Police officials here said that DP centers, including their own, could possibly be prime targets for the radical groups.

They declined to elaborate on their security provisions at their own centers, but suggested closed-circuit television surveillance, additional guards, stricter security checks on personnel, especially part-time or nightshift people, and inspection of parcels brought into the areas by visitors.

Court Facility

Peter Deuel, administrative assistant to the clerk of Cook County Circuit Court, said that the court's DP center contained records on cases tried and to-be-tried in the county that includes all of Chicago and most of the northern suburbs, including Evanston.

"I would prefer," he said, "not to say anything about security on our center other than whatever it is, it is being increased."

A large Chicago retailer, who markets nationally and who requested that the firm's name not be used, said: "When it comes to

our DP operations, we would prefer that people didn't even know we had computers.

"We are even upgrading our printout so as to make it appear typewritten. But we have been in DP for some time now, and we have been security minded all along. However, we are now in the process of tightening security, physically."

At Chicago's Federal Building, closed-circuit television has been installed to survey the lobby and the shipping-receiving dock area.

Universities Surveyed

A survey of universities in the area by CW showed that security seems to be a decision left to the DP department head.

At the University of Michigan in Ann Arbor, Owen Campbell said that his security was beefed up after the bombing of the DP center at Sir George Williams College in Montreal.

Two college centers have been damaged since that bombing, Fresno State College in California and the University of Wisconsin's Army Math Research Center.

At the University of Chicago, DP manager Fred Harris said that his center doesn't have guards. Harris feels that his people (the workers in the center) care enough for their work not to damage the center. He said that he didn't think "outside sources" would be interested in his center.

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B700 Series Price/Performance Comparable With IBM 370 Line

(Continued from Page 1)

communications capability; and systems expansion without reprogramming, accomplished through dynamic allocation to make use of added equipment.

The B5700 features a dual processor system and provides four times the power of the B5500 for data base management and data communications, according to Burroughs.

The B5700 central system includes one or two 1 μ sec central processors, up to 262,144 characters of 4 μ sec memory, up to four input/output multiplexing channels, a central control, console and supervisory printer.

The system controls of the B5700 and B6700 permit all I/O operations to take place independently of each other and allows simultaneous read/write/compute operations, Burroughs said.

Memory exchange permits instantaneous connection between any memory module and any processor or I/O channel. I/O exchange permits instantaneous connection between any I/O

channel and any I/O unit, according to Burroughs.

Lease prices range from \$15,000/mo to \$50,000/mo.

The B6700 is said by Burroughs to be two to five times as powerful as the 5700, and is oriented toward large-scale data communications and data base applications.

The B6700 includes up to three 200 μ sec central processors, three I/O processors with 12 data switching channels each, a maintenance diagnostic logic processor, and one or two operator's consoles and controls.

Three levels of memory are available on the B6700 with a total capacity in excess of 6 million bytes, and a cycle time of up to 500 nsec/word.

The B6700 lease prices will range from \$30,000/mo to \$180,000/mo.

The B7700 is said by Burroughs to have two to 10 times the power of the B6700. It is described by the firm as being a very fast parallel processing system with exceptional versatility of configuration.

Total main memory capacity is over 6 million bytes with a speed of 1.5 μ sec. The technique of memory phasing and interleaving, according to Burroughs, results in effective main memory time of 60 nsec/byte.

The CPU has a speed of 62.5 nsec and incorporates a 32 word (48 bit) associative memory of integrated circuit design with a speed of 62.5 nsec/word.

Rental prices will range from \$60,000/mo to \$300,000/mo.

The B5700 is code-compatible with the B5500 and the B6700 is code-compatible with the B6500 and B6700, Burroughs said.

Dubbed the B9484 by Burroughs, the two new disk pack drives closely parallel the design of the IBM 3330. The Model 3 has an average access time of 42.5 msec, and the Model 5 an average time of 38.4 msec.

The B9484 is presently available with the B6700 and B7700 systems. Prices start at

\$1,000/mo for the 121 million byte model.

The two new head-per-track disks are primarily designed for use with the optimized memory banks introduced for the B500 series. The drives are intended for use with operating systems or data files that have very high activity.

The B9472 Model 1 has a capacity of 15 million bytes and the Model 3, 30 million bytes; both have an average access time of 20 msec.

The B9472 Models 2 and 4 are slower at 35 msec, with a capacity of 20 million bytes and 40 million bytes respectively. The 9472 is not available with the B5700. The price of the Model 1 is \$1,400/mo.

The single-processor model of the B6700 is currently being demonstrated, Burroughs said, and the multiple-processor model will be demonstrated in December, with delivery to begin in February of 1971.

The B7700 will be ready for delivery in early 1972, and the medium-scale B5700 will be ready for delivery in December 1970, Burroughs said.



The Magnetic Actuator Disk Pack Drive Memory Systems can have storage capacities ranging from 121 million bytes to 1.6 billion bytes.

Model	IBM 3330	B9484 Model 5
Characteristics		
Average Access Time (msec)	30	38.4
Rotational Speed (rpm)	3,600	3,600
Data Transfer Rate (byte/sec)	806,000	806,000
Storage (Mbyte)	200 to 800	200 to 800
Storage Capacity (19 surfaces each)	2 to 8 packs	2 to 8 packs
Price (8 packs)	\$357,200	\$316,800

The chart compares the new Burroughs B9484 mass storage disk devices for the B700 series with the earlier IBM 3330 announced with the 370 line.

Model	370/145	B5700	370/155	370/165	B6700	360/85	360/195	B7700
Features								
CPU Monthly Rental (\$K)	10.4 to 18.4	10.9 to 18.2 (2 CPUs)	21.5 to 45.2	39 to 70.8	10.9* to 36 (3 CPUs)	62.2 to 145.5	96.8 to 167.8	35* to 105 (4 CPUs)
Min.-Max. Memory Sizes (K bytes)	112 to 512	128 to 256	256 to 2,048	512 to 3,072	288 to 6,144	512 to 4,096	1,024 to 4,096	768 to 6,144
Cycle Time/Byte (μ sec)	.135	.625	.06	.02	.033	.06 or .07	.09	.033
Byte/Access Cycle	2	6	2	8	6	16	8	6
Channels	5	4	6	12	36	12	13	192
Interleaving	none	none	none	4-way	2-way	2- or 4-way	16-way	4-way

*Cost of memory not included. Minimum cost for B6700, \$7,500/mo; for B7700, \$11,500/mo.

Comparison of New Burroughs B700 Series Processors With IBM 360 and 370 Models

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OCR System Reads Pages, Cards With Same Device

(Continued from Page 1)

The basic CPU, with 8K of core, is limited to recognizing 45 characters concurrently.

Additional core could be used either to store additional characters while Swami was in use, or for user-written problem programs unrelated to the OCR operation.

The readers can handle a variety of paper stock as well as sizes, but can work with material as heavy as card stock only in the normal punched-card size.

While not as fast as systems dedicated to small documents, the readers can process 5,000 to 10,000 document/hr and that should be sufficient for most users, the company said.

Recognition of handprinted characters is possible either as a standard, but extra cost, hardwired option, or through the software, the company said.

In addition to the "self-teaching" capabilities of Swami, the system also allows the operator to exercise options such as acceptable limits of character degradation.

The company noted further that the hardware and software recognition capabilities can be intermixed at the user's option. This would allow fast, hardwired recognition of standard OCR fonts, for example, but leave the reading of German, Russian or Japanese Katakana characters to the slower software processing.

Used together, the software processing can verify the hardware reading, the company said, or can allow the successful entry of characters that are too degraded to be acceptable to the hardware logic.

Additional cost options also permit the reading of specialized input such as journal tapes.

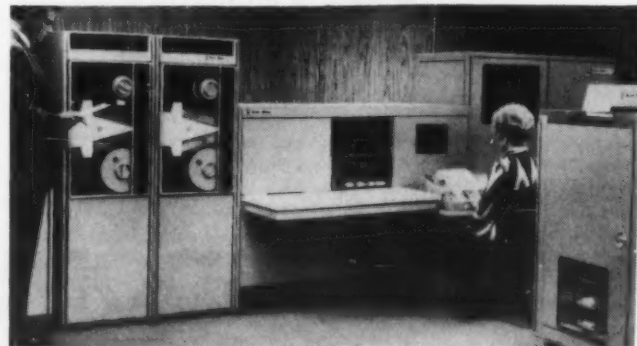
While the 250/350 can handle input of varying size, it cannot do so on an intermixed basis. Cards and 8-1/2 in. by 11 in. bond paper can't be read in the same pass, for example.

All of the enhancements, both hardware and software, can be

field installed on Model 200/300 systems already at user sites.

With the upgrading, the monthly rental would increase about \$500, a spokesman estimated.

Scan-Data Corp. is at 800 East Main St.



Scan-Data's new Model 250 OCR Page/Document Reading System includes a new input feed which accepts documents as small as 3 in. by 7 in. and pages up to 11 in. by 14 in.

Loose Chads Compound Detroit Voting Problem

(Continued from Page 1)
by the voter's stylus, the chad is supposed to be removed in the presence of one Democrat, one Republican, and one Election Commission worker.

Fryzelka charged to the board of city canvassers that a Datamedia Computer Service, Inc. volunteer worker ordered removal of chads from voted punched card ballots by center workers without proper supervision.

The Datamedia worker, LeRoy

Spotlight on Voting

Hutton, the county clerk of Randall County, Texas, admitted the charge, claiming several problems forced his decision.

Hutton explained that he is not an employee of Datamedia, but was helping out in Detroit while on his vacation. Randall County, Texas, was Datamedia's first customer four years ago.

'Short of Help'

Hutton said he was short of help and that was why he gave the order to punch out the loose chads individually against the urgings of the accuracy board's request not to, according to Fryzelka.

A Detroit voter, Henry Schimenski, told CW he did not like the new voting system. He

said that he had had trouble making the "little holes in that stupid card," so a precinct official helped him work the stylus. "I don't know whether I voted or she did," he said.

The voting procedure was not simple, especially for those people with low reading skills or for those not accustomed to the new voting machines, like the elderly.

Booklet Prepared

A 30-page booklet was prepared for the voters giving instructions on the use of the new voting machines and listing the 256 candidates.

To vote, a Detroit voter was required to insert a prepunched tab card into the voting machine and punch out a partially punched-out chad to indicate the candidate or proposition for whom he wished to cast a vote.

In a related court suit, some 38 candidates charged that they had voted for themselves and still did not receive any votes in the returns.

Wayne County Circuit Court Judge Richard M. Maher ordered election officials to open the sealed boxes of three precincts to search for tabulation sheets for Republican precinct delegates.

An explanation of the missing votes was offered by an assistant corporation counsel of Detroit who suggested that a candidate could have voted for himself but "voted incorrectly," thereby nullifying the vote.

Contest Seeks Methods For Destruction of Data

(Continued from Page 1)

Popek, is currently embroiled in a year-long disagreement with a major credit card company. The dispute arose after the theft of Popek's card last year, he said.

He stated that after informing the company of the theft, he continued to be billed for service station charges incurred.

While not accusing the company of misusing computerized information, Popek said there was a lack of communication which could be intensified by the lack of human intervention.

Popek is a specialist in information systems at Harvard, but stated, as a member of the general public, "the only way we can be protected is if we get outraged." This is unusual, according to the 25-year-old graduate student, so the contest was designed to bring computer problems to light.

The public television special is "offering me, in a sense, an opportunity to shoot off my mouth," Popek said, calling the contest "an effective way of gathering material."

He said he hoped the "counter-measures" to computer abuse would never be used by the general public, but openly admitted that what happens to the "solutions" represents a "real problem."

He said he and cosponsor Mark Tuttle, 26, had talked about the social implications of the con-

test, but had reached "no satisfactory conclusion."

Meanwhile, they offer a \$50 prize to the "Little Man" abused by credit companies, government agencies, banks, the FBI, etc. There are three other areas which warrant \$25 prizes, all of which will come out of the sponsors' pockets.

- "The Computer Jock" - designed for an infiltrator. In other words, if you could get a job working for the computer user, who had perpetrated evil, what evil could you do him in return?

- "The Scheming Institution" - politics or corporations. For example, neutralizing an opposing political candidate's information by changing voter information in his data bank, or copying his mailing list.

Stealing or copying mailing lists from competing organizations was also suggested as a means of reducing the value of computerized information.

- "James Bond" - anything technically feasible, whether it be humorous or serious. For example, designing a "Mission Impossible" tape which will dissolve at a given signal or time.

A Boston newspaper used the example of employing a magnet to destroy tape libraries.

Popek stated this would not accomplish anything because "magnetic tape libraries are all kept in duplicate, which are locked in vaults."

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It comes pretty close to the price/performance standards set by RCA6. And that's pretty good.

But it doesn't have virtual memory, as we do. Or a Video Screen Operator Console. Or a Front End Communications Processor. Or even Switchable Memory Banks. As we do.

And it doesn't compete with RCA2, or the virtual memory RCA3 and RCA7.

And IBM doesn't have a Conversion Guarantee. As we do.

Still, the 370/145 is a good machine, and gives RCA6 a fight. So it's time to put the facts on paper where you can judge who gives you more.

And we're just the guys to do it.

Not just better price/performance. RCA has a whole new approach to computer efficiency.

Memories jam up as workloads grow, slowing a system until it may use less than a quarter of the power you pay for.

Especially when the maximum memory size you can get is too small for the processor.

That's the memory bind. You have to pay for a bigger processor just to get more memory.

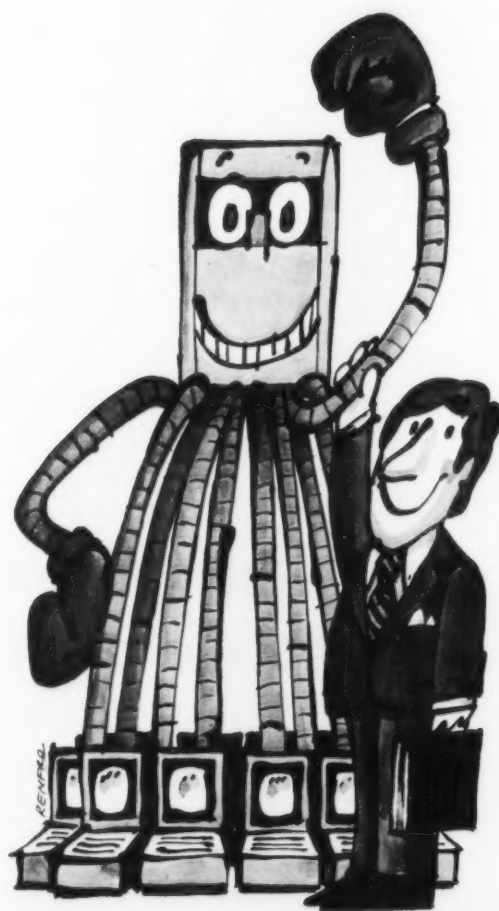
We solve that two ways.

First is with tight-fisted real memories in RCA2 and RCA6. We found a new way to build lower cost memories with the same proven technology that IBM stayed with in their more expensive 370's—the 155 and 165.

So we can keep prices down, and match memories to processors more sensibly than ever before. So you can afford memories big enough to go with the power you want.

And the hot new software for our computers takes less memory space than other operating systems.

The second way we beat the memory bind is with the virtual memory in RCA3 and RCA7. Virtually unlimited memory capacity.



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Virtual Memory is a combination of hardware and software that makes a computer work as though its main memory were unlimited in size.

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You get more, bigger jobs done faster. And new programming done much more efficiently.

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And each one works as though the computer were all his.

The only new computers that have it are RCA3 and RCA7.

vs. IBM

standard. IBM's new computer approaches it. from a computer company. Here it is.

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A comparison of RCA6 and 370/145 shows where we're a better alternative.

Let's look first at the choices facing a typical 360/40 user who's outgrown his system.

This is the only place IBM's new 370/145 really tangles with us.

Let's say you have a 360/40, 262K memory (the maximum), for \$22,300 a month. You outgrow the memory and want to double it.

IBM offers you the 370/145, at 512K (the maximum, which IBM says won't be available till March, 1972), 4 times the power of your 360/40, \$29,000 a month.

We offer you RCA6, at 512K, 4 times the power of your 360/40, \$28,600 a month, and delivered in 1971.

That's nearly \$5,000 a year less than the 370/145.

So, they almost matched us.

But don't forget, their memory limit is 512K, and RCA6 has a maximum 2000K before you need a bigger processor.

Examples show that RCA 2, RCA3, and RCA7 are still in a class by themselves.

For a 360/30 user looking to grow, RCA2 is, typically, \$41,000 a year less than 370/145.

Or, move up to the virtual memory RCA3. You could do batch jobs plus time sharing all day, run your 360 DOS programs at night, and still pay only \$100 a month more than for a 370/145.

For a 360/50 user who needs to grow, IBM offers the 370/155.

We can give you virtual memory in RCA7, for \$26,400 a year less than the smallest 370/155.

Or, an RCA6 with 655K real memory for \$15,600 a year less than a 512K 360/50.

If this rough comparison piques your interest, you won't have long to wait to see the real thing in action. We'll begin demonstrations this year.

Three contract options no one else offers make our new computers easier to get.

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When we fight, you win.

Giving you what you want, and making it easy to get. It's the only way to win you over.

That's why our new computers are designed to be a better step for you than the next size 360 or 370.

That's why we have a 360 Mode of Operation—and why we'll guarantee conversion.

That's why we set the cost/performance standard for others to follow.

It's the Octoputer philosophy—a helping hand hand hand for the customer is a jab at the competition.

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COMPUTERS

Spotlight on Louisiana—Part I

Successful State DP System Depends on Cooperation

By Edward J. Bride

CW Staff Writer

BATON ROUGE, La. — Control.

Cooperation.

Coordination.

These and scores of other management-oriented descriptions explain why Louisiana officials believe they have a unique data processing system at the state capital, a system which runs 24 hours a day, seven days a week.

The State Computer Center serves 25-30 agencies with its around-the-clock operation, and officials are predicting that the center will generate millions of dollars in annual revenue, while keeping tabs on legislation, wild-

life, and automobile registrations.

On top of the organization is a joint legislative-executive committee, charged with overall management responsibility and supervision on a policy basis. The committee, perhaps unique itself, is also the approving authority for the purchase and selection of all EDP equipment and related services.

Directly subordinate to this "board of governors" is Everett McCoy, a retired Air Force colonel experienced in management information systems and who came to the state directly from the Pentagon three years ago.

Around the time McCoy was retiring from the military, Univac was installing a 494 system. McCoy became director of the computer center when data processing became a separate state agency in September 1968.

McCoy thus holds a position equivalent, for example, to the commissioner of administration, who also happens to be a member of the Joint Legislative Data Processing Committee. The DP official contends that the joint committee of lawmakers and executives is unique in the nation.

Included in the list of "customers" are the State Police, who use a Univac 418-II, on-line with the State Computer Center and the FBI's National Crime Information Center.

The state has about 2.5 million licensed drivers, and the 494 at the capital contains information on their convictions, accidents, and restrictions.

The estimate of millions of dollars in annual revenue is based on improved efficiencies in state agencies, increased controls over existing revenue sources like state income tax and state-owned mineral leases, and new or expanded federal funding for state projects.

Better management of state-invested funds is also anticipated with the help of the computer, which currently answers up to 1,000 inquiries per day, plus the legislative inquiries.

Besides overseeing the State Computer Center, the joint committee coordinates the use and

management of data processing systems by any state agency or division, but not parishes and municipalities of the state, when such operations are entirely or partly funded by state and/or federal funds.

There are dozens of applications, including some designed to perform searches for taxpayers who have not filed state income tax returns.

The Public Affairs Research Council, an independent organization supported by private funds, has responded to a request by the governor to assist in developing "more complete and comprehensive budget and financial information on a current basis."

In Part II CW takes a detailed look at some of the applications.

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Mass. DP Overhaul May Save \$300,000

BOSTON — Some concrete, in-pocket savings will soon be shown to state taxpayers, who seem to be unaware of the alleged waste of millions of dollars within the Massachusetts data processing organization [CW, April 1].

The first of many efficiencies will be establishment of a second shift for the IBM 360/40 at the Department of Public Works (DPW). The added shift will result in a net savings of \$56,000

because it will allow the removal of a 360/30 and cancellation of outside time rental on a 360/50.

Several other management measures are reportedly close to finalization, and are expected to save nearly \$300,000, with future projects adding to the total, perhaps even multiplying it.

The DPW project is scheduled for completion by April 1, and represents the first hard savings to be identified since release of a stinging report last spring by state DP administrator Alvin Kaltman.

Kaltman indicated that large purchases had been slowed or halted, as were new contracts for new projects, but that currently authorized projects were being continued.

Kaltman's report last spring charged underuse and mismanagement was costing Bay State taxpayers millions.

Biggest furors were raised by welfare recipients, who invaded

the Welfare Department's computer center in April when social workers blamed the machine for holding back 600 checks.

Kaltman has also noted with interest the recent savings reported by some states, most recently Ohio, by switching to independent peripherals.

He is studying the benefits of such a policy, and may recommend that Massachusetts replace its IBM peripherals with plug-to-plug compatible equipment from another manufacturer.

The state of Ohio recently reported saving \$300,000 by making such a move, a saving of 30% under what it was paying IBM.

Kaltman said he hopes to use prisoner programmers in the conversion of IBM 1401 Autocoder programs to 360 Cobol to increase efficiency.

He also stated that he hopes to save \$30,000 in annual equipment rental by eliminating some of DPW's EAM equipment.

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When Businessman Gets Together With His DP Facility, Watch Out!

WELLESLEY HILLS, Mass. — The more contact a businessman has with his computer department, the more likely he is to have a negative attitude about EDP.

This is the finding of an attitudinal study of 800 individuals involved in EDP activities, sponsored by Keane Associates, a management consulting firm, in conjunction with the Sloan School of Management at MIT, during the past year.

The study concludes the grow-

ing interdependence between the computer department and user departments in most organizations is a source of such potential conflict that positive management involvement in computer affairs is becoming mandatory.

Favorable Attitude

The report also notes that the greater the perceived management support for the computer, the more favorable attitudes toward EDP will be, and the more involved people are in the design of new computer systems, the greater their positive attitude.

When the only contact with the computer department is caused by bad service, however, negative attitudes result. This is the explanation Keane gives to the result cited at the beginning of this story, since in most cases there is insufficient involvement of the EDP department with user departments.

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Editorials

Voters Disfranchised by Computer

First, much fuss is made in this country about the importance of a person's right to vote. Get-out-the-vote campaigns are often based on the fact that one vote could decide an election.

Second, there is no reason why computers can't be a great helpmate in the handling and tabulating of election results.

Points one and two add up to the need for a computerized election system that improves the chances that a citizen's vote will be properly counted.

Messing around with election results is an old political game in this country, a game one sincerely hopes is not played much anymore.

But computers are ideally equipped to handle the checks and balances necessary to prevent the game from being played.

Instead, what do we have? A computerized election system that, for whatever the reason, is often so badly implemented that, instead of improving things, actually disfranchises some voters.

Let's not run laboratory tests at the expense of the voters' rights.

D.C. Data-Line

Delphi Conferences May Fill Communication Gap

By Alan Drattell

CW Washington Bureau

WASHINGTON, D.C. — A great deal of imaginative work in the computer area is going on within the Federal Government, some of it officially sanctioned and some of it resulting from individual initiative.

The latter has been a factor in an on-line computer meeting experiment conducted last spring by Dr. Murray Turoff, operations research analyst, Systems Evaluation Division, Office of Emergency Preparedness (OEP).

The meeting, called a Delphi Conference, involved 20 individuals across the nation. A Delphi Conference is a sort of real-time accounting system.

"Instead of taking sales records, we're taking statements by individuals on particular topics," Turoff explained.

Some of the 20 people in the experiment were affiliated with the government, others with industry, still others with non-profit organizations and universities.

"The group was also professionally mixed," said Turoff, "and comprised individuals in the areas of Delphi design, corporate planning, computer science, information systems, management systems and operations research." About eight of the people had no previous experience with computers.

All of them were linked via teletypewriters to a Univac 1108 located at a central site.

The purpose of the experiment was to evaluate the potential utilization of Delphi Conferences not only in the Federal Government but also in private industry.

"The Delphi," explained Turoff, "could be used as a device for holding management conferences, for example. It could be used by a group of people at

various sites to solve a common, complex problem."

Ninety-eight proposals in all were generated by Turoff and the conference communicants.

A typical proposal was the following:

"A system of this type (a Delphi) can be adopted by government agencies or executives as a rapid-response policy research and planning capability, for example, to aid the National Science Foundation in monitoring, evaluating and reacting to the present crises in the science community."

The respondents could answer at their leisure and change their original votes if desired. When all 20 were in, the vote was tabulated.

If the responses raised additional questions these would then be formulated and posed to the group on the terminal.

To date, the Delphi has been most widely used in the areas of technological forecasting and corporate planning.

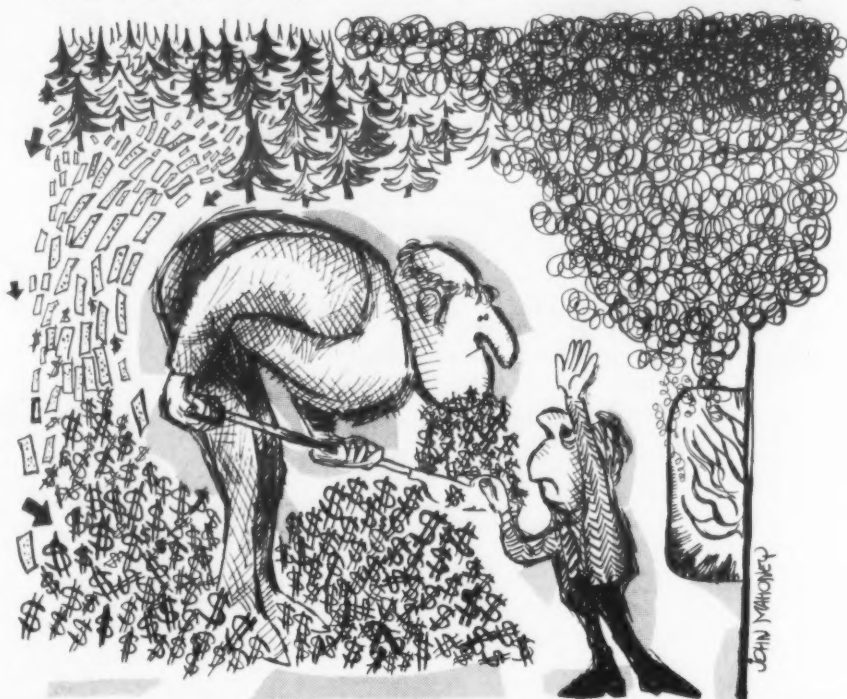
The Delphi technique itself is over 10 years old, but it has only recently become a recognized discipline.

Costs incurred during the 13-week experiment, he continued, were relatively low. The respondents used about 100 hours of terminal time and less than one hour of processing time for a total of less than \$1,500 if figured on commercial time-sharing rates.

The Delphi Conference is effective for small to large groups, Turoff said, and responses can be random and short. Frequency of interaction is up to the individuals involved.

The real-time Delphi, he said, is not a substitute for voice communications; it fills a gap where text is involved. "It is an exceedingly useful tool," he added.

Save a Tree—and Make Money



Letters to the Editor

GE User Groups Very Active And Interested in Merger

Alan Taylor, in his article on Honeywell — GE users, has trod, somewhat indelicately, on unfamiliar ground.

First, he gives an impression that the various users of GE and Honeywell equipment have done nothing to take advantage of the merger and, second, implies that if we don't, some dire fate awaits us resulting from our inaction.

I take issue with the entire article as regards the GE users groups, and will welcome any Honeywell user to back me up from that side.

As a matter of fact, Mr. Taylor, I was in Phoenix the day of the announcement and received the news directly from high-level representatives of GE.

Since that time I have written two very pointed letters to GE management requesting more information and strongly noting our concern as users.

I also question the implication (by omission) that the GE 400 Users Association is of no consequence to GE or Honeywell. The 200 and 600 users are mentioned, but what about the 400 Users Association? This group totals more members than the other GE groups combined!

It is evident to us that the users of the GE 400 are interested in the merger and their future, and the replies to our efforts signify their willingness to act.

Our inactivity, as Mr. Taylor seems to view it, stems not from a lack of initiative or action, but from the inability to get any positive results from either GE or Honeywell.

From my point of view, the GE users have done everything short of marching to and pounding on the doors of Messrs. Borch and Binger. I hope Mr. Taylor does not advocate that

Michael R. Copeland, President

GE 400 Users Association
Chicago, Ill.

I was referring to effective action — not just action. The fact that Mr. Copeland's group can now think of nothing more than that they can do except start marching, even although to date Honeywell and GE have been unresponsive, is a typical example of the need that the users have for effective action — which was my real point. AT.

Auerbach Ratings Are Corrected

Several errors appear in the GE 655 and Honeywell 8200 sections of the Auerbach Mainframe Price/Performance Ratings CW reprinted Sept. 30 on Supplement/Page 2.

For the GE 655, it should show "yes" for on-line maintenance diagnostics.

For the Honeywell 8200 these corrections should

be made: Integrated circuits should be "yes." Operating Support should be Mod 8, an operating system developed especially for the 8200. Simultaneous Instruction Execution should be "yes." Maximum Disk Transfer Rate should be 1,200K or 1.2 million char/sec for the Type 267 device. Maximum Printer Speed should be 1,100 line/min.

Paul J. Derby
Group Product Manager
Large Systems

Honeywell Information Systems
Wellesley Hills, Mass.

The material printed was an accurate copy of the Auerbach tables, and Honeywell has asked Auerbach to correct the originals. Ed.

Control Data 6000 Series Computers Do Not Have Equal Compute Power

The chart on Price/Performance ratings [CW, Sept. 30] is, to say the least, extremely misleading. Machine cycle time is *certainly* "not necessarily" a direct measure of total system throughput. It is more typical to have negligible relations between the two. The entire Control Data 6000 Series all have equal memory cycle times, but certainly not equal compute power.

Certainly Auerbach doesn't contend that the Univac 1108 is only one sixth the speed of the 370/155. The miniaturized footnote, although an admission of the questionable value of the charts, appears to imply that memory cycle time *may* relate to performance in a few of the computers in the charts — I doubt that this is so.

Secondly, the data in the chart is wrong and/or incomplete. The Control Data 6638 Disk File has a transfer rate of 1.68 million char/sec.

Charles R. Gerlach

Dallas, Texas

Comparing memory cycle times may be of questionable value, but can anyone suggest anything better? Ed.

Price of 1400 Emulator \$400/mo

The article announcing the IBM 370/145 [CW, Sept. 30] gave the price of the 1400 emulator on the 370/155 as \$3,950/mo and of OS/DOS compatibility as \$5,450/mo. According to the information I have, the prices should be \$400/mo and \$250/mo, respectively.

David G. Shackley
Consultant

Montreal, Canada

You're right. Somehow the model numbers were substituted for the prices during preparation of the story. Ed.

Can You Answer the \$64 'Isam' Overhead Question?

One of the comments about some of my remarks on Cobol overhead has been: "Why talk about Cobol overhead? Don't you know that such-and-such's overhead is much worse. Go talk about them! Leave us Cobol users alone. You are giving us ulcers!"

This has been a fairly standard

reaction to some of my recent columns pointing out that, by and large, people do not know what their Cobol overhead is.

And there is something quite reasonable in this, too. It is not only Cobol that has overhead costs involved — other things have as well.

PL/I, for instance, can be quite horrendous.

But it, like Cobol, is a language, and it is not only languages that have overhead; so do utility routines, like various access methods to disk.

Isam

One of the best known of these access methods to disk storage is the IBM's free Index Sequential Access Method, commonly called Isam. Here the task is to find a record whose identification you know, but whose actual address on the disk you do not know. The finding is done through a number of indexes — the master index, the cylinder index and the track index which provides a starting place for looking for the record.

All the logic involved in the record retrieval is standard — so that in many ways Isam overhead (that is the time that Isam takes to return the record by comparison with the time that the same record could be returned using the same information on the same equipment) is something that can be reasonably expected to be understood before Isam is highly used.

This differs from the Cobol or PL/I situation, where the overhead is defined by the particular program and cannot be estimated without examining the program.

So, because of this difference, our consideration of Isam can be somewhat different from our treatment of Cobol. In the case of Cobol, my question, "Do you know what your Cobol overhead is?", was somewhat rhetorical — because I personally could not possibly know the overhead

of every Cobol program in your shop.

Nor could I ask you to show me that you were able to recog-

nize the overhead associated with a particular Cobol program that I might have included in the column. You would not be able

to do so because of the different compilers, operating systems, etc.

world.

Overhead Is Known

Obviously, I am holding something back. I know something more than I am telling you just yet. I have quite a good idea as to what the overhead actually is — and in a month's time I'll be publishing it in this column so that everyone can compare the answers.

What I'm interested in right now is not what the Isam overhead is — but whether or not Isam users understand what it is. And by looking at the responses we will be able to see that.

But while I am holding something back for the moment, I am also giving something away. Knowing what the overhead is the \$64 question for people who want to use their computers efficiently. So for the correct \$64 answer — well, there will be a \$64 check. One for each question.

Good hunting for the \$64 answers!

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The Taylor Report

By

Alan Taylor, CDP



The Four Questions

The \$64 Model 40 Question

A user of an IBM 360/40 equipped with Model 2314 drives, and operating under the Disk Operating System, processed 200 transactions against a newly reorganized Isam File A, and used part of the information obtained from File A to update a different newly reorganized Isam File B.

The process included a retrieval of a control record from A, a search on A randomly to ensure that no current record had the particular identification, the insertion of one record onto File A and two new records onto File B, and then the return of the updated control record to File A.

At the start of the job each transaction took two seconds, and at the end took 35 seconds. All told the job took 1 hour, 50 minutes.

The \$64 Model 50 Question

A user of an IBM 360/50 with 2314A drives and operating under the full Operating System processed 1,308 new records from tape onto an 85-cylinder newly reorganized file (File A) with eight cylinders of independent overflow. The time involved was 1 hour, 9 minutes.

The tape had been previously sorted so that the records were presented sequentially in descending order so as to minimize the time involved. The record size was 450 characters, blocked five and with three blocks to a 2314 track.

After the records were added, the resulting file, and a second file, File B, were processed for 400 transactions. The second file consisted of 63 cylinders of 150-byte records, with the records blocked 14, and again 3 blocks to a 2314 track. The processing consisted of going sequentially against File A, and updating it; then adding a record to File B randomly. Files A and B were held on different spindles.

The time involved totalled 1 hour, 25 minutes, with the adding of records to File A taking 1 hour, 9 minutes and the processing of the 400 transactions taking 16 minutes.

The \$64 Model 65 Question

A user of an IBM 360/65 with 2314A drives had five Isam files — A, B, C, D, & E — spread over four spindles, with each file taking between 30 and 150 cylinders. All had been newly reorganized.

Five hundred transactions were processed at the highest priority then in use (12) to update each file.

The file arrangements were: A, record size 314, blocked 5; File B and C both record sizes 106, blocked 6; File D record size 21 blocked 9; and File E, record size 34, blocked 6.

The time for the job was 24 minutes, with 15 seconds of CPU time reported utilized.

Then:

To enter the \$64 Isam Overhead Question Contest, estimate what time the work necessary for any one (or more) of the above tasks really is, and send your estimate together with your calculations to: Alan Taylor, CDP, The \$64 Isam Overhead Question Contest, Computerworld, 797 Washington St., Newton, Mass. — to arrive not later than Nov. 12, 1970.

Any reader is eligible to enter unless he has actual knowledge of the particular cases. No one can win more than one of the four \$64 prizes, all of which will be awarded. In the case of more than one correct answer, the prize will be awarded to the person submitting the most meritorious calculations, in the opinion of the judges.

An Estimate

But in the case of Isam it is practical to ask you — (at least those of you who use Isam on IBM'S 360 computers) — to estimate what the overhead might be in some specific cases. So let's do that.

In the box on this page you will see four cases described, using three different 360 computers. In each case you are told how long a particular action took, and what we want to know is just how much of that time do you think is really necessary, remembering the work that has to be done.

For instance, if you think that the 200 transactions could have been processed in one hour in example one, rather than in the two hours it actually took, just write "one hour." Then close a brief explanation as to what work you feel could have been avoided, and how you have calculated your savings, and return the form to me at Computer-

Software Specialists Needed in Japan

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Shared Facilities Approach May Cut Hospital Costs

By R.V. Buchwald

Special to Computerworld

It has become the exception rather than the rule lately when a newspaper, magazine, or related technical journal goes to press without printing some reference to the growing cost of operating medical facilities or, more generally, the rising cost of patient care.

Although specialized medicine and a shortage of physicians, technicians and medical facilities can be accepted as contributing factors, the one area of discussion relative to rising cost, that hasn't been highlighted, is the rising cost of patient administration.

The lid on the proverbial box cannot be removed entirely, but there is one particular area that if not openly discussed will soon mature into the most awesome and unparalleled consumer of the patient care dollar the medical profession has faced to date.

'Mystical' Computer

This area is data processing, or, more specifically, the computer which enjoys a shroud of mystical powers.

There can be no logical argument about the value and contribution of automation operating in the biomedical environ-

ment. However, Medicare and the various agencies and insurance companies' insatiable appetite for statistical and financial information and managements' need for more current information, make it clear that a computer can be a vital, essential

Viewpoint

tool for the medical profession.

Suddenly, the computer and automated data processing are being accepted as a messiah. As so often happens to many industries, in this type of situation, the medical community is also about to overcompensate.

Controversial though it may be, there are a few basic facts that management would be well advised to consider prior to making any commitments in favor of automated systems.

Several major categories need to be identified to illustrate these points:

- Computer installation costs.
- Availability of qualified computer personnel.
- Shared systems.

Consideration need not be given to technology, the equip-

ment has more than proved itself capable.

When it comes time to select from the ranks of computer programmers, systems analysts, and data processing managers to install and operate the equipment, the medical community has entered into direct competition with all of American industry and state and federal governments.

It should only seem reasonable that in light of the tremendous growth of the computer field a critical shortage of qualified personnel exists.

The medical industry in desperation is willing to grab the hand of the first passerby who can say "core storage" or "CPU" or mumble some other data processing jargon unidentifiable to the average person.

But progress has been and is being made by many qualified data processing personnel who have a sincere interest and pride in their business and are aware that an honest contribution and a good job is a reward in itself.

And there are the hazards. It isn't often that the non-data processing-oriented user knows that electrical requirements for even a small computer system can cost several thousand dollars to install — that site preparation

for a thousand (not several hundred) or more square feet could run from \$10,000 to \$30,000 — that the computer system gives off more BTUs than an active volcano; and thousands of more dollars will be needed to install adequate air conditioning, independent from the rest of the building for year round operation.

There is indeed a common sense approach to this situation. First, hospitals must put aside petty jealousies and stop giving consideration to the prestige factor that is so prevalent when it comes to computers and automated data processing.

Hospitals that already have systems installed would be very happy to provide other hospitals with data processing and consulting services to help cost justify their system.

Sharing a computer with other medical-oriented institutions may well be the solution, but

one must be careful in choosing partners.

Medical data centers, however, are hospital-oriented in that they possess all of the technical experience and resources necessary to serve large and small hospitals. The shared facilities approach is unique since all that is asked of the hospital is to recover installation cost and a modest profit. More important, all systems are hospital tested and are operating under hospital conditions.

This service, if taken advantage of by other hospitals, will contribute measurably to the curtailment of rising patient cost and prove once again that the medical community has the best interests of the patient at heart.

R.V. Buchwald has 12 years of data processing experience (six in the medical environment), and has organized, designed, and installed the Washington Data Center.

Specter of Unemployment Haunts The 'Empty' Aerospace Companies

By Miles Benson

Special to Computerworld

There is an epidemic across the land. Aerospace companies, trapped in a financial vise, have cut adrift tens of thousands of employees.

The epidemic is known as "unemployment," and families from Seattle to Cape Kennedy and Boston to San Diego have been touched by its hand.

Computing employees, once thought immune from such problems in their profession of infinite potential, find themselves felled by the disease as readily as others.

The plight of the stricken has been well documented. But what of the survivors, those who remain behind to staff the suddenly shrunken companies? What is a survivor's eye view of the effects of the epidemic?

Picture a gigantic hangar, where once were made the flying weapons of war. Picture yourself opening a small people-sized door in a corner of a giant airplane-sized hangar door, and stepping inside. Acres of empti-

ness stretch before you.

And what of the computer center? It's over there, past the office building marked "New Hires Report Here," the one they abandoned almost a year ago. A moving van is backed up to the door; blue and grey black boxes, covered carefully with heavy pads and handled as if they were giant cabinets full of fine china, are a dismembered computer on its way back to the vendor.

Inside, in a hallway, waste containers inexplicably contain reels of magnetic tape, possibly caught up by some inventory cost-cutting crusade.

The computer room, once packed with shoehorn precision to allow maximum floorspace utilization, now is a sparsely planted garden. Rings of faintly visible discoloration mark the spots from which computers left to join the ranks of the unemployed.

The hurt is hardest for those who have departed, of course; but for those who remain behind, there is the constant, plain-tive reminder of the way it was.

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Modeling Sought Of Great Lakes

ANN ARBOR, Mich. — The five North American Great Lakes — Ontario, Erie, Huron, Michigan, and Superior — are the largest inland water bodies in the world. Any one of them is larger than the ponds dubbed "sea" by European and Asian name-givers. Now a research committee here is planning to "pour" them into a computer for analysis.

The Great Lakes Basin Committee, a state-federal organization headquartered here, with its membership representing the eight states with shores on the Great Lakes (as well as the nine-cabinet level federal departments with responsibilities for national water resources), is getting ready to support a research study aimed at determining whether the five Great Lakes can be simulated in a computerized model.

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Computer Goes Riding

HARRISBURG, Pa. — Racial balance in the schools of this capital city was achieved with the assistance of a computerized busing plan, according to local officials.

The plan was developed by the Center for Urban Education, of New York, under a subcontract to Philadelphia's Research for Better Schools, Inc. (RBS).

About 1,000 parents objected to the busing plan when it was presented last summer, and many of these objections were resolved successfully, according to an RBS spokesman.

Harrisburg's school population is more than 13,000, from kindergarten to high school, and the balance was intended to reflect the overall student breakdown in each institution, within a 10% variance to allow for hardships or other objections to busing.

Individual objections were resolved on a case-by-case basis, so that in no instance did the computer override a human decision, RBS noted.

Federal Employee Receives \$27,054 Courtesy of 'Computer Assisted Error'

DENVER, Colo. — A 60-year old federal employee has an \$8,000 "interest-free" loan from his boss, thanks to a "computer-assisted error."

The error began in the General Services Administration office in Kansas City, where a clerk was preparing vendor vouchers for payment. The clerk apparently used the employment number of Prentiss Sykes, a \$3.94/hr employee, instead of the vendor number, when preparing the

computerized voucher.

A Kansas City firm had painted a federal courthouse there, billing the government for \$27,054.49. By using the faulty vendor number, the computer wrote the check for Sykes, who said he thought the windfall was the result of good luck on a stock purchased by a friend, in Sykes' name.

The Denver mechanic spent \$7,910.57 before the Secret Service and the GSA determined

the error. He had paid off his mortgage, car, two finance company loans, had taken his family on a weekend trip to Wyoming, and sent his wife to San Diego for his son's graduation from Marine boot camp.

Federal officials said that Sykes has agreed to pay back the expended funds in monthly interest-free payments of \$300.

N.J. Campaign Centers on DP Contract Award

HACKENSACK, N.J. — Charges of "political cronyism" have made a keypunch contract a campaign issue in the race for a seat on the Board of Freeholders for Bergen County.

The all-Republican board awarded a \$97,000 contract for conversion of tax records to the First National Bank of South Jersey last spring. There was no public bidding for the job because, according to the county administrator, there was no other bank in the state equipped to do the job.

Opposition candidate Kevin McDermott contended that several firms in Bergen could have done the job adequately, instead of awarding the job to an Atlantic County firm 150 miles away.

The South Jersey bank, in Atlantic County, made 4,000 errors in about 7,000 records in this city alone, asserted Democrat McDermott, who accused the Board of Freeholders of awarding the contract to a bank with "poor supervision and little knowledge of Bergen."

The bank's president is reportedly a long-time political associate of a powerful Republican state senator, Frank S. Farley, of Atlantic. Farley campaigned on behalf of a Bergen politician, McDermott charged.

Computer Aids 49ers' Scouts

SAN FRANCISCO — The professional football team here, the 49ers, is using a computer to process statistics from its scouts, resulting in "more scientific answers" to rating problems.

President of the 49ers, Lou Spadia, stated that scouts will always be used to collect the needed statistics, but the computer could help rate potential players without human error or prejudice.

"The computer cannot determine the human factor," noted Spadia, referring to a man's ability to survive "the rough going."

He said that the scouts' reports "are now supported, and enhanced, by computer accuracy."

Space Program Is Verbose

WASHINGTON, D.C. — The memory required for the Apollo mission, 1.5 million words, is an indication of the increasing complexity of space travel computations. A mercury mission program required 40,000 words.

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October 14, 1970

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Information System Requires No User Programming

By Don Leavitt
CW Staff Writer

LOS ANGELES — Minerva on-line information system users have been able to go on-line practically overnight without having to do any programming, according to the distributor, Data Concepts Inc. (DCI).

Developed by Diversified Information Systems Corp., Minerva is based on user-completed parameter cards, rather than problem programming.

While Minerva is conceptually an on-line system, it is designed to allow batch processing when that approach is deemed most effective.

Minerva is sufficiently generalized, DCI said, to let the user select any combination of on-line and off-line processing to meet his needs.

Data Gathering

According to DCI, Minerva can gather data on-line from ter-

minals and/or off-line from more conventional sources. With the system, the user can maintain a data base in an on-line and/or off-line basis, and he can retrieve data for terminal display or batch processing report generation.

DCI claims that Minerva provides a standardized approach to a variety of data processing functions.

It can also support a variety of terminal types in what the company calls "reasonably variable" quantities, so that the user can

meet his own needs. If appropriate, terminal lines can be closed down without affecting the use of the remaining lines or terminals.

Flexibility

The company also said that Minerva's flexibility is reflected in its ability to handle variable or fixed-length records with variable or fixed formats.

Minerva is said to be able to utilize files generated under Cobol, PL/1, Fortran and other languages. It allows the on-line

creation of new records or the updating of existing records, and provides file protection against unauthorized access to the files.

Minerva also provides for the acquisition of data from multiple data sets in any single retrieval transaction.

The company only claims to be able to perform basic arithmetic and/or logical operations on data under Minerva itself, but the system does provide exit points through which the user can access his own routines in other programming languages, in order

to perform more complex operations.

Minerva operates under either DOS or OS/360, in as little as 44K of storage for the basic module. The modular design of the system allows it to be reconfigured on-site without disturbing the existing programs and/or data bases, the firm said.

The basic Minerva system costs \$12,000; the fully extended system costs \$25,000, according to a Diversified spokesman.

Data Concepts Inc. is at 4055 Wilshire Blvd.

'Series' Emphasizes Total Systems Design

SAN FRANCISCO — A three-part systems development system called Series is designed to generate source program coding, structure data bases, and implement on-line applications.

Information Systems Manage-

ment (ISM), the developer, notes that Series emphasizes total systems rather than individual program design.

While it does ease much of the coding chores, it also imposes standards that can be applied

through a system. The standards are said to be particularly important during program maintenance operations.

Series is comprised of three integrated parts: the program generator, file structures and access methods, and on-line services.

ISM explained that these parts have functions similar to Informatic's Mark IV, IBM's Information Management System (ISM), and to General Analytic's Query Language/1.

The Series generator produces Cobol code and Job Control Language from basic input specifications. It can also handle applications using the most complex systems logic, according to ISM.

Simple Structures

The Series file structures and access methods are designed to permit a user to gradually evolve his data file from simple structures through advanced developments in indexing, randomizing, record packing, and other data handling technologies.

In addition to conventional methods, Series permits content indexing for flexible data selection to meet unforeseen management information requirements. It also permits users to create logical files by combining rec-

ords from separate physical files, thus allowing easy establishment of multifunction data bases.

Series on-line services provide immediate response to management requests. These on-line services include data collection, query, update, file manipulation, and processing.

In field tests, 10 programs in two applications were written, compiled and tested through to operational status in 82 hours, using the Series generator.

If conventional Cobol programming had been used, the project would have taken 306 hours, the user estimated.

Although the programs involved in the field tests were rather routine data retrieval, collection and distribution efforts, the user said he was very pleased with the results.

An OS/360 version of the Generator is available now; a DOS version will be ready shortly. The on-line services modules will be ready in December.

The basic file structures and access modules are available now; the complete segment will be ready by the second quarter of 1971.

The generator is priced at \$30,000; the file structures/access methods and the on-line services segments at \$20,000 each.

Information Systems Management is at 120 Montgomery St.

OS/360 Conversion Package Changes MTST/MTSC Codes to Ebcidic Format

SUNNYVALE, Calif. — A code conversion package, M-797, that allows IBM Magnetic Tape Selectric Typewriter/Composer (MTST/MTSC) users to access data to and from computers in Ebcidic format, is available from the Mellonics Division of Litton Industries.

The developer said that this capability should be particularly useful for systems requiring text editing, automatic typesetting, and updating of files, for rapid publication of such things as parts lists and catalogs.

According to Mellonics, the M-797 program is designed for use with the magnetic tapes produced by the Litton 9209 tape-to-tape converter.

The 9209 is a standalone unit that transfers information stored on MTST/MTSC cartridges to and from standard half-inch

wide magnetic tape, normally for archival purposes.

Data from more than 300 MTST cartridges can be stored on one 2,400-ft reel, but in a code that is not usable by computers.

Two Modes

Implemented under OS/360, the M-797 program operates in either of two modes:

- In Forward, the program accepts a 9209-produced tape, converts the MTST/MTSC code to Ebcidic and outputs this code to a sequential data set on a user-designated device. In this phase, all MTST/MTSC preindex and reference codes are dropped for more efficient processing.

- In Reverse, the program converts a properly formatted data set into 9209-compatible code and outputs this code to a 7-

track tape for 9209 processing. Preindex and reference codes are reinserted during this operation.

The conversion program is said to include logic to check for error conditions including both format and conversion errors. Synchronization errors, undefined or illegal characters, records that are too long, and read/write errors are all covered by the program, Mellonics said. A report of errors, if any, is provided.

The M-797 program functions under OS/360 in a partition/region having a minimum of 24K bytes. A 7-track tape unit is required for the 9209-compatible tape. The program is written in Assembly Language and is available on a license basis for a one-time charge of \$2,500. Similar programs for computers other than the 360 are quoted on request, the company noted.

The 9209 Tape-to-Tape Converter sells for \$22,800, and rents for \$505/mo for a minimum of 12 months.

Mellonics Division of Litton Industries is at 1001 W. Maude Ave.

RCA Spectra Version Developed for 'Culprit'

BOSTON — Culprit, a report generator, is now available for RCA Spectra 70 equipment, from Cullinane Corp. It was previously available in DOS and OS/360 versions, the company said.

According to Cullinane, Culprit can handle virtually unlimited numbers of input files and can produce up to 99 reports and/or output files in one pass. Unlimited calculation, selection and calculation-based selection are also possible, Cullinane said.

The reports produced by Culprit can be formatted with header, detail and total lines, or in detail-only or total-only form. Besides reports, Culprit can produce tape, sequential or index sequential disk files, or card files, in the same run as it

produces the printer output.

A spokesman explained that Culprit is based on machine-language subroutines assembled under direction of user-completed parameter cards. With this approach "assembly" time is minimized and reports are generated at close to maximum printer speed.

The Culprit RCA version is available at the same prices as the IBM DOS and OS versions: \$10,800 for a three-year lease and \$1,080/yr thereafter.

Full warranty and continued support is provided for the entire period of use. Cullinane said that installation, user training and documentation are included.

Cullinane Corp. is at 60 State St.

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Brokers Commission Package Distributes Overwrites

SAN FRANCISCO — A Commission Accounting System (CAS) for brokers and dealers in the securities industry has been developed for CNA Investor Services Inc., and is available from Western Operations Inc.

According to Western Opera-

tions, the system integrates all areas of the broker/dealer's commission accounting operation.

At the present time, CAS is handling mutual fund salary savings, contractual, withdrawal and other plans for CNA. The system is modular to permit easy

modification to meet individual user's needs.

The system provides for prompt and accurate payment of commissions to salesmen, Western said, and also can distribute overwrite payments for up to five layers of management.

Western said that CAS is based on a minimum number of data files for rapid processing. Although a series of reports are generated normally by the sys-

tem, special "one time" printouts can also be generated.

CAS is backed by a staff of Western Operations' specialists who provide technical assistance.

This staff assists the broker/dealer organization in training everyone who will be associated with the system and modifies the system to meet the user's specific needs. In addition, the system is documented in detail for easy maintenance and updat-

ing, according to Western.

CAS is available through sale, lease or rental plans, Western said, or through facilities management or remote processing by Western itself.

Cost of the package depends on the user's requirements but, for an average installation, might be \$30,000 according to Western spokesmen.

Western Operations is at 120 Montgomery St.

Updated Murs Added to DOS/360

DANBURY, Conn. — Management of DOS/360 installations can evaluate and improve operations, program and scheduling efficiency with an enhanced version of the Machine Utilization Reporting System (Murs) from Webster Computer Corp. (WCC).

Murs is a complete job accounting, project reporting and computer performance measurement system. It automatically

records all programs run under DOS in each partition.

Murs can function on a 24K 360/25, WCC said, but would normally be used on nothing smaller than a 32K 360/30, with either a 2311 or 2314 disk pack.

Written in BAL, Murs is available under license for one CPU for a charge of \$3,000.

Webster Computer Corp. is at 1 Padanaram Road.

Infonet Service Aids Insurance Sales

LOS ANGELES — Life insurance salesmen can get almost two dozen types of computer-prepared sales illustrations tailored to their customers' needs through the Computer Sci-

ences Corp. national time-sharing network, Infonet.

Aimed at helping salesmen increase their commission income, the service provides ledger-type illustrations, estate planning,

pension and profit-sharing, business analyses, and evaluations of corporations formed by physicians and members of other professions.

The illustrations, or printouts, were developed by Xanadu-Planning Services of Chicago in conjunction with authorities in insurance and systems design.

They are completed through client information keyed into the Infonet system from a remote terminal.

The service uses prestored tables covering rates, policy cash values, dividends and related data, by company to illustrate how the client's needs can be met.

With the speed and accuracy of the calculations available through the service, Infonet noted that the salesman can generate various sets of illustrations to highlight possible trade-offs to his client.

For the Infonet service, there is a total of \$100 initiation fees, and a minimum monthly billing of \$25. Actual billing is based on time and equipment used, and a royalty to Xanadu.

Corporate headquarters for Computer Sciences Corp. and the Infonet time-sharing service is in Century City.

Sure, the Sycor 340 data communication system gives you clean source data capture.

Sycor 340. The one CRT terminal that does it all. Heart of the Sycor System. Trim. Tasteful. Yet figuratively bulging with the newest of proven, mass-produced modular microprocessor technology. All of it operator-oriented. So easy to learn and use that any regular office guy or gal takes to it quickly and can achieve high productivity without knowing a thing about data processing.

Entry by electronic keyboard onto magnetic tape cassettes permits data to be recorded about 30 per cent faster than it would be electromechanically. Sycor 340's unique automatic paging option handles even long or complicated forms by accepting them in small segments, or pages, easily scanned. Then, it automatically displays page after page of labels and field control characters, easy for the operator to follow. And (hallelujah!) no cards, no paper tape to mess with. Just compact cassettes that hold the equivalent of 1400 punch cards. Easy to load and to store. Thriftily re-usable.

You can interface the 340 with the Sycor printer and get all the versatility of high priced line printers. Use multipart, continuous, pre-printed forms for a host of applications.

Like order forms. Remote invoicing. Remote payroll checks. Whatever.

Two 10-digit accumulators—a Sycor first, by the way—generate totals or subtotals detecting keying errors in keying or verifying.

Other error detection features include visual proof-programmed entry, format field and character checking, and check digit verification. Add and subtract operations give you automatic total and subtotal field computation and entry without re-keying on an adding machine. Result? Clean tape output—at the data source—that cuts delays and confusion, dramatically lowers mainframe processing costs.

for zero balancing, de-numeric data, without re-

Other error detection features

reading from the CRT, pro-

grammed entry, format field and character checking, and

check digit verification. Add and subtract operations give

you automatic total and subtotal field computation and entry

without re-keying on an adding machine. Result? Clean

tape output—at the data source—that cuts delays and con-

fusion, dramatically lowers mainframe processing costs.

But data capture is only a part of what you really want a terminal system to do for you, isn't it?

Sycor's modular system can be configured for batch communication, via the voice-grade public telephone network, for attended or lower-cost unattended operation. Sycor's binary synchronous procedures, with automatic retransmission that provides automatic error detection, and speeds of 1200, 2000 and 2400 baud, are compatible with S/360 hardware and software.

You can set up an off-line system that gives you the advantages, but none of the complexities, of teleprocessing, by using the Sycor 610 Communication Converter Station at your central office to record on, or transmit from, computer compatible magnetic tape.

That's another part, right?

Talk to Sycor.

100 Phoenix Drive, Ann Arbor, Michigan
313/971-0900

SI
SYCOR INC

Sort Included In Leasco Remote Response/360

BETHESDA, Md. — Leasco Response Inc. has expanded the information applications package of the Response/360 remote computing system.

A sort program that allows users to obtain printed reports by rank order or specific subgroups has been added to the Information for Management Decisions (Informd) package, a group of subprograms that gives users the capability of creating data files, retrieving selected information, and preparing reports.

The format of the files is flexible; and file records may be selectively added, modified, or deleted.

The Response/360 system provides services including Basic, Fortran, and PL/I programming languages and a variety of applications software in areas such as mathematics, business, finance, management information, and statistics.

Response/360 users are charged \$5.75/hr of connect time, with a \$100 monthly minimum billing. There is no CPU time charge.

Leasco Response Inc. is at 5401 Westbard Ave.

October 14, 1970

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SEL Mini for Real-Time Use Is Faster Than PDP-11

By Frank Piasta

CW Staff Writer

FORT LAUDERDALE, Fla. — Users of real-time mini systems are being offered an alternative to the DEC PDP-11 with the Systems 82, a 16-bit minicomputer with comparable price and performance, from Systems Engineering Laboratories (SEL).

Featuring a 900 nsec cycle time, the Systems 82 is faster than the PDP-11/20 which will be equipped with a 980 nsec cycle time after April 1, 1971 [CW, Aug. 5].

The prices of the basic configuration for both models are approximately the same at \$11,000.

Various features are offered with the Systems 82 that are said by SEL to be unobtainable with other similarly priced

minis. These include eight priority interrupt levels, a real-time clock, and power fail-safe/auto start. Hardware Multiply/Divide is optional, however.

CPU core memory is available in sizes ranging from the basic 4K words, expandable in increments of 4K, to a maximum of 16K words. Four high-speed general-purpose registers are available to the user program to perform multiple-precision arithmetic.

Three of the registers are also usable for indexing purposes. Both pre-indexing and post-indexing techniques may be used, SEL said, with no additional instruction time required.

Multiplexer

An 8-channel multiplexer with data rates up to 1.1-million

word/sec, called the Mios (Multiplexed Input/Output System), is offered with the 82.

Register I/O facilities are also provided for transferring data in 16-bit, parallel-word formats at rates of 20K word/sec.

The Systems 82 is offered with a range of normal peripherals, in addition to communications interfaces, analog and digital input/output equipment, and modular real-time software.

Also featured in the 82 is an instruction set that is said to make programming easier, keeping program run time to a minimum. All instructions in the basic machine are executed in one or two memory cycles.

The Systems 82 is designed, the company said, primarily for real-time data acquisition and



Systems Engineering Laboratories Systems 82 16-Bit Mini

control applications. The small computer can deal with problems in such applications as production testing, process control, communications, component testing, manufacturing, materials handling, data concentration, remote batch job processing and peripheral processing, the com-

pany said.

Initial customer deliveries of the Systems 82 are scheduled for the first quarter of 1971.

Virtual Memory Mini

Systems Engineering Laboratories announced previously this month that it would be offering what it said is the first virtual memory mini. SEL acquired rights to the System 72 from Multidata, which developed it as the Model A [CW, Sept. 9].

Since the machine's initial announcement by Multidata in November last year, the price of the Systems 72 has been increased by \$4,000 in its basic configuration, from \$14,995 to \$18,995, by SEL.

The Systems 72 includes in its basic configuration 4K 16-bit words of 880 nsec core memory, 32K words of fixed-head disk memory, memory access controller, central processor, I/O bus, and a teletypewriter with paper tape reader and punch. It is currently available.

Systems Engineering Laboratories is at 6901 W. Sunrise Blvd.

Quantor Integrated System Meant for COM Users

CUPERTINO, Calif. — The first product from Quantor Corp. is designed to give the user a complete system for his first venture into COM.

Described as fully integrated, the Quantor 1.2.3 can accomplish all of the steps in the off-line COM process, starting with the recording of data onto

microfilm, through making copies on film, to the retrieval of recorded information.

Modular in nature, the system is made up of components which also allow the user who already has some COM facilities to add only those he presently lacks.

Three Devices

The system comprises three de-

vices. The Quantor 100 Recorder, consists of a tape deck, a character generation system, a film transport, a film developer, and a monitor screen.

The built-in developing ability allows the user to view the microfilmed data within 30 minutes after it was recorded. Input is on magnetic tape (9-channel, 800 bit/in.) recorded in Ebcdic format.

The Quantor 200 Copier is a film that operates in normal room light, eliminating the need for a dark room. It can produce a 100-ft cartridge of film every three minutes, according to Quantor.

The third component in the system is the Quantor 300 Display Station. Using the 300, Quantor said, a user can view any one page in a 50,000-page file in approximately 10 seconds. The microfilm is threaded automatically on the station.

A feature of the device is an optional electronic page-number indicator that enables the operator to isolate any page in a cartridge file in a matter of seconds.

Read forward speed of the 300 is 15 seconds for a 100-ft cartridge. Rewind time for the same cartridge is 20 seconds. The image is viewed on a 24-in. by 24-in. screen at 24X magnification and can be rotated 360°.

IBM-Compatible

The system is compatible with IBM tape formats and will accept either Print or COM formatted tapes. The user can also use Quantor-designed software to convert System 360 formatted data into formats optimized for use with the Quantor 1.2.3.

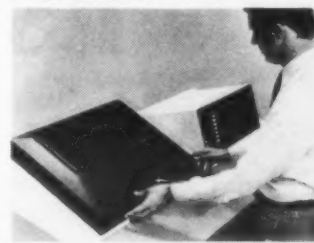
Quantor claims that its system is approximately 45% lower in cost than competitive equipment.

The Quantor 100 recorder sells for \$49,950 and lease prices begin at \$1,575/mo. The price of the Quantor 200 duplicator is \$6,950 or \$295/mo. Each Quantor 300 display station will carry a price tag or \$695 or lease for \$40/mo.

All lease prices include maintenance by Comma Corp.

First deliveries are scheduled for October 1970.

The Quantor Corp. is at 10950 N. Tantau Ave.



Quantor 100 Recorder One-Step Film Processor

Semiconductor CPU Among New DG Novas

By Frank Piasta

CW Staff Writer

SOUTHBORO, Mass. — The use of large-scale integrated circuitry in a minicomputer, and a mini with a semiconductor memory are features of a new line of three Data General (DG) computers.

The Nova 1200, the Nova 800, and the solid-state memory Supernova SC are compatible with each other and with Data General's current computers, the Nova and Supernova. Software is common for all Data General computers and I/O interface is interchangeable.

Described by the company as the simplest minicomputer available, the Nova 1200 is the least expensive model in the Data General line. It has a cycle time of 1.3 μ sec, two and one-half to three times faster than the Nova.

The Nova 800 is a fully parallel minicomputer with an 800 η sec cycle time. Faster, more powerful than the 1200, it is designed especially for use in applications with high I/O requirements, the company said.

The Supernova SC is the first general-purpose mini with all semiconductor construction, according to Data General. The 300 η sec semiconductor memory is claimed to make it the fastest mini available.

It was preceded by a dedicated system using the same technology, the Four-Phase System IV-70. The cycle time of the byte-oriented Four-Phase is 1.9 μ sec/3 bytes.

The recent announcement that

the cycle time of the PDP-11/20 would be decreased to 320 η sec in April 1971 places that model in the same performance category as the Supernova SC.

Since the prices of the systems are directly comparable, the user will probably be left with the task of deciding whether he is willing to trade the potential hazard involved in using a volatile memory against the semiconductor system's advantage of being able to execute many of its instructions in one machine cycle.

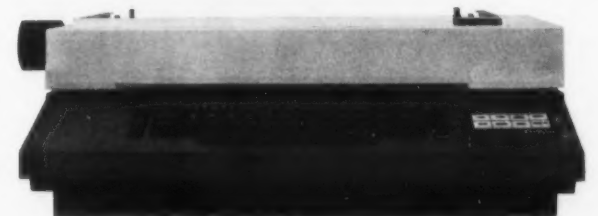
Memory Intermixed

Semiconductor memory can be intermixed with core memory in blocks of 4K words. The purpose of this is to allow the user to protect either program, or data in case of power failure. Semiconductor memory is volatile, and thus would lose data when power was lost.

Base price for a 4K Nova 800 with Teletype interface and data channels will be \$6,950 and discounts are available. First deliveries are slated for April, 1971.

The Nova 1200 will cost \$5,450 for a model that includes a 4K 16-bit word core memory, Teletype interface, and data channel. Memory is expandable to 32K in 4K increments. First deliveries of the 1200 are scheduled for February 1971.

The Supernova SC is scheduled for delivery in April, 1971. The basic configuration, with 4K of memory, direct memory access, and Teletype interface is priced at \$11,950.



All Novar terminals can be equipped with built-in modems that offer the best signal-to-noise ratios available — reducing to a minimum errors introduced by noisy phone lines. One of many Novar features that assure data accuracy.

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Accounting Machine Includes Internal Programming

DETROIT — Burroughs has combined the striped-ledger card handling capability of its E4000 series with the internally programmed structure of its L-series of equipment to produce a faster, more versatile accounting machine.

The new member of the L series, called the L5000 Magnetic Record Computer, can read data from and record it on magnetically striped-ledger cards.

These cards, called Magnetic Memory Records, have been used with Burroughs accounting machines for some 15 years.

Data is recorded on each card in two ways. It is printed on the face of the card, enabling visual verification of the data, and it is recorded on a magnetic stripe on the back of the card. The stripe has a capacity of 352 digits.

The Magnetic Memory Record Cards are 11 in. deep and can vary from 6 in. to 14-1/2 in. in width.

The use of a common data storage medium should ease problems of transi-

tion to the faster device for current users of Burroughs E2190 and E4000 equipment.

Internally, the machine is identical to the L4000. It is programmable in a subset of Cobol either by the user or by Burroughs.

The programs are compiled on a B3500 computer, the L5000 having no compiling capabilities of its own.

Fixed Disk

Main memory is provided by a fixed disk with a capacity of 1,024 eight-byte words. The disk revolves at 6,000 rpm and has a head/track configuration, resulting in an average access time of 5 msec.

The Cobol-generated programs make use of firmware, strings of microinstructions stored on the disk. The firmware is designed for a particular configuration and can be changed in the field to suit the user's needs.

Printing on the ledger cards is accomplished with a device called a form handler. This unit can handle front-fed cut forms, and continuous forms as well.

The 26-in. transport has a 255-position print line providing space for many kinds of forms and documents, according to Burroughs. The printer is capable of 20 char/sec.

The L5000 Magnetic Record Computer operates with a variety of input and output peripherals which are said to

increase accounting and management reporting flexibility. Input devices include a punched paper tape reader, an edge punched card reader, and an 80-column card reader.

Output devices can include a paper tape punch, an edge-punched card punch, and an 80-column card punch.

The price of the L5000 Magnetic Record Computer can vary from \$19,900 to \$36,000. It is currently available on a two-week delivery schedule.

1130-Type Disks Used With Minis

GLENDAL, Ariz. — Four disk memory subsystems, disk cartridges, similar to those used with the IBM 1130, are designed by the manufacturer, Computer Memory Devices Inc., to be usable with most minicomputers.

In addition to the cartridge storage, two

of the units incorporate a fixed disk.

The MD-2101 and MD-2101-2 are both single cartridge devices. They differ in that the MD-2101 uses a cartridge with a capacity of 25 million bits, while the MD-2101-2 uses a cartridge that can store up to 12 Mbit of data.

Access time for both units is 134 msec, average. Rotational speed is 2,400 rpm. Data is organized into 3,200 sectors with 8 sector/track.

The MD-2121 and MD 2221, in addition to removable cartridges, also provide fixed disk within the same units.

Both the MD-2121, which has a recording density of 1,100 bit/in. and the MD-2221 which has a recording density of 2,200 bit/in. feature two disks on a single drive.

The fixed disk is used for storage of permanent programs while the cartridge is used for data storage.

Both units use standard disk cartridges. The MD-2121's removable disk is the IBM 2315 or equivalent. The fixed disk is also an IBM 2315-type disk enclosed in a protective shroud within the unit.

The MD-2221 uses IBM 2316-type disks in a similar configuration. Capacities of the MD-2121 and MD-2221 are 24- and 50-million bits, respectively. One-half of the rated capacity is in the fixed disk in each unit.

Performance figures and data formats would be the same as for the single disk units.

The price of the subsystems, including the disk drive, power supply and interface controller is \$9,950 for the MD-2101, \$10,995 for the MD-2201, \$11,600 for the MD-2121, and \$12,200 for the MD-2221. All models are currently available 90 days ARO.

Computer Memory Devices is at 5170 W. Bethany Road.

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Your department.

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DATA RECOGNITION CORPORATION

Plug-to-Plug CDC Disks Are 2311-Compatible, Usable With IBM 360

MINNEAPOLIS — Control Data Corp. has announced the availability of a compatible disk drive for the IBM 2311.

Called the Control Data 2311 Disk Storage Drive, the device is said to perform better, faster, and at less cost than the IBM unit. The 2311 handles any IBM-compatible six-disk pack and is completely interchangeable and data compatible with the IBM drive.

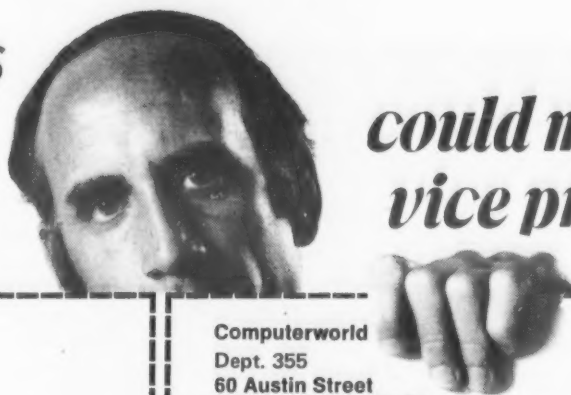
Average access time is 55 msec, 25% faster than the 2311, according to CDC. The increase in speed is due to the use of an electro-mechanical positioner to move the read/write heads over the disk surfaces, in place of the hydraulics used in the 2311.

Stop time of the 2311 is given as 20 seconds. CDC said that this is 60% faster than the IBM device's stop time of 36 to 60 seconds.

The CDC 2311 is priced at \$20,000 in quantities of one to four and at \$15,000 when between four and 15 are ordered. One-, three-, and five-year lease plans are available at prices that are negotiable. First deliveries are scheduled in October on a 30-day delivery schedule.

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If you're a manager who knows he needs to know more about the computer, but unwilling to take a vow of poverty by returning to school, you'll find this new medium of management education invaluable.

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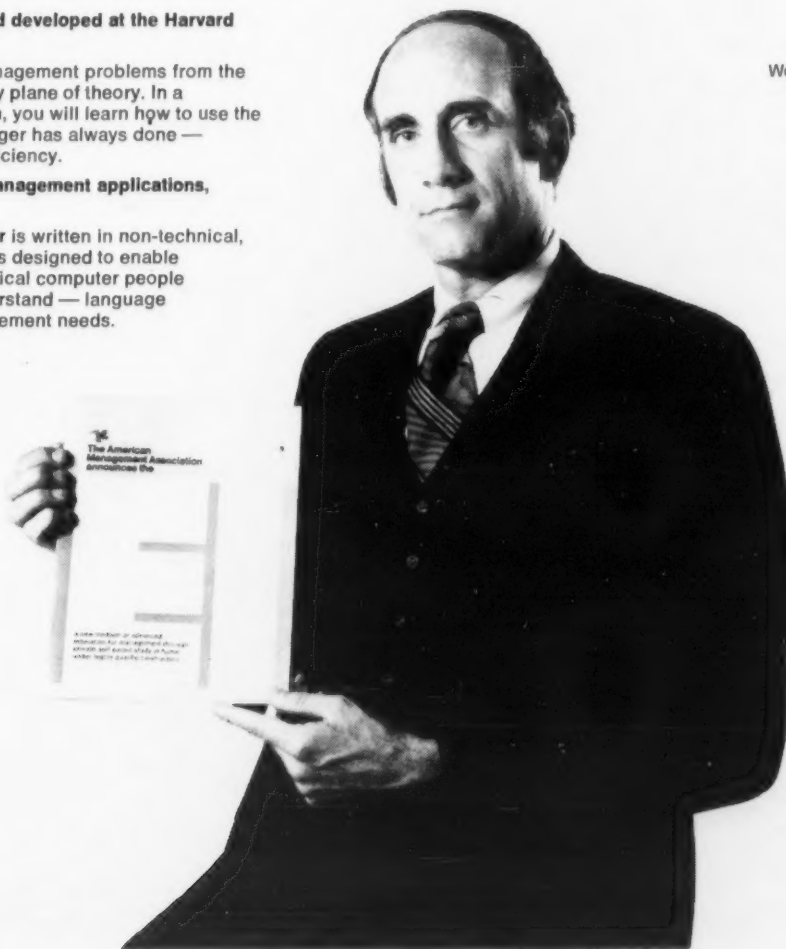
You do not have to adjust to the gait of a formal class, which might be either too fast or too slow to suit you. Studying under a highly qualified AMA staff instructor, you work with text materials and programmed cases of proven capacity to sharpen your powers of analyzing and solving difficult management problems. You submit written reports which your instructor reviews, grades and returns to you with his detailed criticisms and personal comments. This procedure provides a continual feedback of correction and guidance.

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We'll supply the disc drive.

MEMOREX

Central Data Unit Cuts Cost of Hard-Wired Control

HATBORO, Pa. — A two-wire computer interface control and monitoring system developed by Compudyne Controls, Inc. is designed to do both control and monitoring at one-half the cost of conventional hardwired systems.

Using a Varian 520/i minicomputer in combination with a two-wire multiplex transmission system, the Dynaplex Central Data unit provides, the company said, a multiplex interface between the minicomputer and remote sources up to three miles away.

The system includes a Central Data Unit attached to the 520/i, and Remote Data Units located throughout the factory near the data sources or control points.

Remote Data Units are addressable by the computer and tie in to the system by parallel tapes on the two coaxial wires.

Each of the maximum of 256 remote units are modular and

handle 32 points with expansion in groups of 16 and up to 128 control and/or monitoring applications each.

For sensor interface, a variety of control or monitoring IC modules are supplied to preprocess and digitize each signal. Thus, A-D and D-A conversions are performed near the source.

Systems/ Peripherals

Source interface modules range from single-point monitor or control to an 8-bit input/output so that remote computer peripheral devices may be operated using the same two-wire system.

2 to 1 Savings

According to Judd H. Orrell, Compudyne product manager, the user of a computer's address-

ing technique and the two-wire multiplexing scheme add up to a savings of at least two-to-one in most cases.

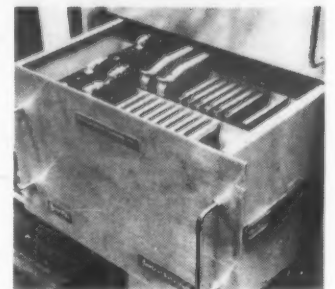
"For roughly \$20,000, a plant can have a data processing system for control or monitoring purposes that uses only two wires throughout and is far more efficient than a \$100,000 or so central processing unit," Orrell said.

In addition to the complete system, including the Varian 520/i, Compudyne will supply

the Dynaplex interface for connection to the user's installed minicomputer.

According to Compudyne, most minis equipped with an I/O bus and an address bus can be interfaced.

The price of the Central Data Unit is approximately \$5,000. Each Remote Data Unit sells for \$1,000. A manual control panel, allowing the system to be operated without a computer, in case of equipment failure, is available for \$500.



Compudyne Controls, Inc.
Dynaplex Central Data Unit

Remote Printers Have Varied Line Width

PHOENIX — Data Computing, Inc. is offering terminal users a choice of three impact printers, featuring the "Crosspoint" print head, and three models of terminal card readers.

The printers, called Typeliners, are available in line widths of 80

and 132 characters and in upper-and-lower and upper-case-only models.

The Cardliner card readers are available in models with transmission speeds to suit various interfaces. Models rated at 10 char/sec, 14.8 char/sec and 30 char/sec are available.

The Typeliner Model I uses an 80-column print line. The simplest model of the line, it prints upper case only. The Model II is also an upper-case printer, but with a print line expanded to 132 characters.

The Model III offers both upper and lower case printing on an 80-column line. A 132-column upper and lower case model IV is currently being developed.

All models of the Typeliner use the Crosspoint impact print head, which, the company said, produces clear, crisp, well-defined characters equally readable on the original copy and the sixth carbon.

The Crosspoint design is said to take advantage of metal flexures to eliminate the majority of moving parts usually found in print-hammer mechanisms.

The Typeliners can be used with CRT terminals or modems with standard EIA RS-232B interface. Print speed is 100 line/min. Printout is on pinfeed, fan-fold paper in multiple sets up to six, and widths of 9-7/8 in.

The Model I will lease for \$245/mo and sell for \$8,250. The Model II rental price is \$285/mo or \$9,600 for purchase. The Model III leases for \$270/mo and sells for \$8,925. All models are currently available, with a 30-day schedule applying to the Model I, and a 60-day schedule to the Models II and III.

The Cardliner card reader is designed for the time-sharing user, according to the company.

The Cardliners read standard punched cards remotely by the Teletype X-ON command or at the reader by depressing the feed switch. Only two moving parts are used.

The reader converts normal Hollerith card codes plus carriage return and line feed to Ascii, BCD or correspondence code for transmission.

The Model 10 transmits data at 10 char/sec, compatible with models 33 and 35 Teletypes. The Model 15 transmits data at 1.48 char/sec, compatible with the IBM 2741. The Cardliner 30 is suitable for use with CRTs and Terminet 300s, with a speed of 30 char/sec.

The models 10 and 15 sell for \$3,600 and rent for \$90/mo. The Model 30 is priced at \$3,990 and rents for \$100/mo.

Data Computing, Inc. is at 2219 W. Shangri La Road.

Compat Unit Handles Remote Job Entries

WESTBURY, N.Y. — Compat has combined two new peripheral devices with its previously announced computing terminal to form a Comfile Remote Job Entry Terminal that is designed

to replace the IBM 2780.

The two new peripherals, a card reader and a line printer, enable the terminal to transmit punched card data at 1,200 or 2,000 bit/sec over dial lines to a

central computer, Compat said. Reports received over telephone lines at the remote site can be printed on the line-printer.

The card reader, the Comfile 88-130, is a vacuum feed, optical device with a speed of 300 card/min. Used in conjunction with the Comfile 88-23 or 88-33 systems, it is said to allow either direct punched card data transmission or recording of card data onto the Comfile random-access data storage magazine.

A basic Comfile Remote Job Entry system, including an 88-23 computing terminal, 88-120 line printer, and 88-130 card reader, is currently available at a monthly rental of \$854, including maintenance.

According to Compat, the printer is an especially valuable feature when raw data is entered remotely, processed at the CPU, and then retransmitted for local printout. Typical applications could include payroll, order processing, inventory control, accounts receivable, and security analysis.

The rental cost of the 88-130 card reader is \$95/mo including maintenance. The cost of the Comfile 88-120 line printer is \$400/mo, maintenance included. Both are currently available on a 90-day schedule.

The Compat Corp. is at 177 Cantigue Rock Road.

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Calcomp CD-12s Replace IBM 2314

ANAHEIM, Calif. — CalComp has combined two of its CD-12 disk drives to form an IBM 2314 compatible random-access storage device.

When used with the CalComp CD-14 controller, the drives can be used to replace a 2314 disk system on an IBM 360, or can be interfaced with other data processing systems, the company said.

The dual drive CD-22 provides a storage capacity of 58 million bytes, a transfer rate of 312,000 byte/sec and an average access time of 35 msec.

Each of the two drives that comprise the CD-22 functions

independently and is equipped with its own power supply and electronics. According to CalComp, the two drives together occupy little more space than a single CD-12.

The CD-22 drive carries a three year lease price of \$790/mo and a purchase price of \$36,000. The lease price includes a maintenance charge of \$120/mo. The CD-14 controller three-year lease price is \$1,200/mo including maintenance; it sells for \$49,900. Maintenance on purchased systems costs \$75/mo.

Initial customer deliveries are scheduled for December, 1970, with a 30 to 60-day delivery schedule thereafter.

MAI Reveals Two Leasing Plans And Unit Record Price Changes

NEW YORK — Two low-cost, long-term lease plans and a revised pricing schedule for outright purchases of unit record equipment from MAI Equipment Corp. have been announced to attract IBM unit-

record users.

The lease plans involve a price reduction on MAI prices for tabulators and calculators. One plan includes an annual renewal lease.

Five-year savings amount to between 4% and 14% on current MAI lease prices. For each year's renewal, MAI reduces the price an additional 3%, up to the fifth year. Thereafter the user may continue at the fifth-year rate.

The other plan, a noncancelable lease for three, four, or five years is said to give the customer immediate price reductions equal to those earned in the third, fourth, and fifth years of the annual renewal plan.

MAI will continue to offer its six-month lease plan, however.

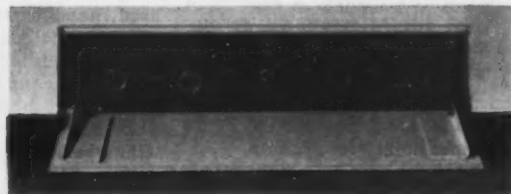
MAI has also revised its pricing schedule for outright purchases by new customers as well as for purchases by current MAI customers. Prices on accounting machines and calculators have been reduced between 20% and 60%. Prices on reproducers have been reduced as much as 10%.



1,998 character display (27 lines of 74 characters each) on a 12-inch screen.
A true stand-alone unit—includes communications interface and modular power supply.



Reliable solid-state circuitry assures virtual trouble-free operation. Maintenance is as easy as opening a drawer.

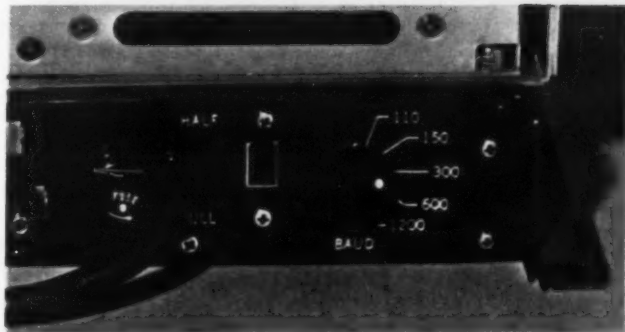


Individual TV adjustments conveniently located up front for optimum operator comfort.

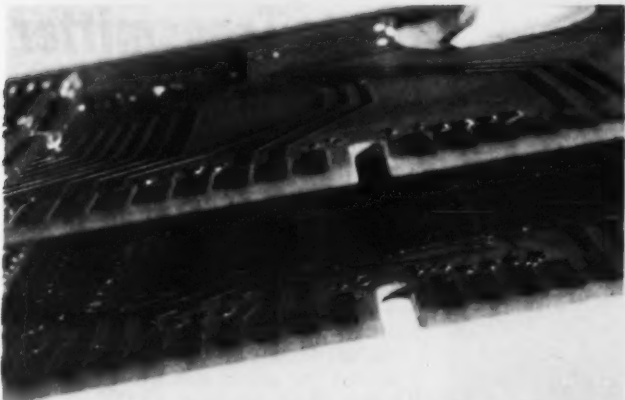


Quiet, solid-state keyboard in Teletype terminal format may be operated remotely.

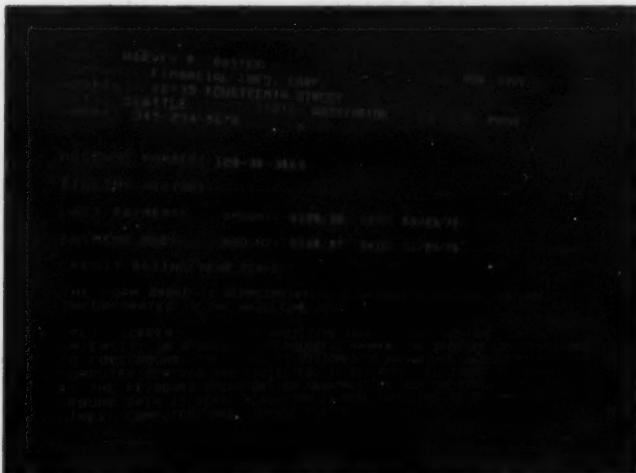
Inside Story of the Video Display Terminal that leaves all the others behind.



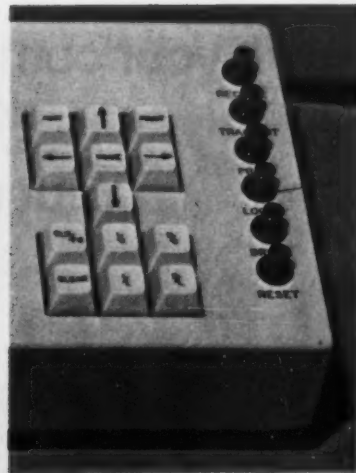
Switch-selectable full- or half-duplex operating modes.
Selectable transmission rates—110, 150, 300, 600 or 1200 baud.
Adjustable up to 9600 bps.



High-speed, random-access core memory (2048 x 8) provides flexibility and efficiency consistent with all the unique design features of the Hazeltine 2000.



Two-level video intensity. Useful for form fillout. Computer-derived protected data is lower intensity; operator-entered data is brighter.
Selective scrolling at any line when under program control; automatically at line 1, unless otherwise directed.
Automatic tabulation in form fillout directs cursor to next entry point.



Powerful editing capability—12 distinct keyboard operations, including line and character insert/delete. 10 functions under computer control, including cursor positioning by X-Y coordinates.

3 remote monitors may be connected without amplifiers. With amplifiers added, the number is unlimited.



Plus: Low Cost!

\$88 per month (12-month rental) plus \$20 maintenance.
We'll be happy to demonstrate the Hazeltine 2000 in your offices.

Hazeltine 2000
Hazeltine Corporation
Little Neck, N.Y. 11362
Phone (212) 423-4800

Whitehead Spells Out Role Of OTP-Active Participant

WASHINGTON, D.C. — Dr. Clay T. Whitehead, recently sworn in as director of the new Office of Telecommunications Policy, has made it clear that OTP will be an active participant in the communications policy development process.

Whitehead said that OTP will function as advisor to President Nixon and coordinator of governmental policy in telecommunication matters. He also noted that his office is expected to pass along to the Federal Communications Commission the administration's recommendation on matters being considered by the FCC.

Whitehead said that OTP would not impose on the FCC's responsibility for decision.

On the other hand, he said that OTP could seek either legislative or court action to reverse FCC decisions if the issue appeared to be important enough.

He also said that OTP wouldn't necessarily wait for a matter to be brought before the FCC through other channels, but would consider raising issues with the commission. He said that this approach would be used only for important issues.

Admitting that recommendations from OTP carried the weight of the President, Whitehead, nonetheless, said that the activities he was outlining by OTP were, in fact, directly comparable to the approach followed by other administration departments in their dealing with regulatory agencies.

Cold Data Line

Special to Computerworld
JUNEAU, Alaska — Experimental attempts to establish a data communication line between Juneau, Alaska's capital, and Anchorage, its largest city, were begun last month.

Taken for granted elsewhere in this country, communication can be a large problem in the vastness which is Alaska. Juneau and Anchorage, to measure the magnitude of the problem, are two time zones and a wilderness apart.

The state of Alaska has a IBM 360/40 in Juneau and an 1130 in Anchorage. The data line tests are hoped to be the first step in eventual computer-computer communication, according to Keith A. Angier, Director of Alaska's Division of Data Processing.

Bell Canada Offers Advice, No EDP Services, to Users

By Don Leavitt
CW Staff Writer

OTTAWA, Canada — M.N. Davies, vice-president of Bell Canada, told a recent meeting of data users here that the Canadian carrier intends to limit itself to the role of advisor in user problems dealing with data services.

The statement differs with recent government recommendations indicating that Bell should be allowed to provide data processing services.

Davies, speaking to the Ottawa chapter of the Canadian Information Processing Society, said that since Bell Canada is the second largest DP user in Canada, it would be in the public interest if the basic skills the firm had developed for its own use "were made available to other users of telecommunications in planning and developing their own information systems."

This suggestion that the carrier should provide advisory service to data communications users echoes the sentiments being expressed at various user meetings by a number of Bell officials, a large Canadian computer data user told CW.

This 'advisory role' is in contrast to the Canadian Government's recent Telecommission Report which indicated quite strongly that the carriers should be allowed to get into data processing services in addition to their primary role of providing communications for users.

The questions that followed Davies' talk indicated considerable misunderstanding between Bell and users.

The users were left with the impression that the carriers are not yet aware of what the EDP market needs. One user said that Bell can't understand that "you can't put a computer out in the boondocks and expect it to work, like a telephone." Others asked why the Multi-com service being offered by Bell was so hard to get installed.

You've gone computer. You've given it a good try. Now you're disenchanted. You're unhappy about the costs/results ratio.

You've also got lots of company.

If yours is a typical situation, it's the most common problem in data processing—and the problem is not the computer.

The bind comes with the excessively high cost of data capture and control: input preparation. And perhaps worst of all, those high costs discourage the implementation of many useful programs. So full use of the computer isn't even being made. (It's like keeping a fine car in the garage because the fuel is too expensive.)

But the gathering of data for computer processing need not be costly or complicated.

With the Addo-X system, data is prepared automatically, in computer-acceptable form, as a by-product of normal accounting, reporting, and record-keeping operations. Key punching is eliminated (count those savings for openers). So are error-correction and data-verification costs.

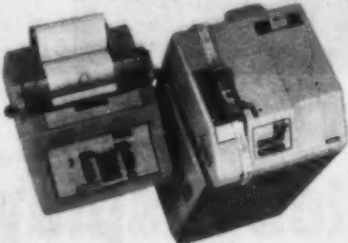
It's as easy as operating a 10-key adding machine. With only an hour or two of training, any member of your

office staff can turn out computer-ready input. No extra procedures, no extra personnel, no extra payroll costs.

And no errors—because this is a programmable method. Procedural errors are impossible; they're actually caught before they happen. (If the operator makes a mistake in the assigned procedure the machine simply locks. No entry, thus no error.)

Many companies of every size are profiting right now from the economical Addo-X system. All it takes is a brief review to see how it can serve you too. And all that takes is your call or note now.

Addo-X, Inc., ADP Division, 437 Madison Avenue, New York, N.Y. 10022 • (212) 758-9171.



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**If your computer looks like a lousy investment,
don't blame your computer.**

**Your data preparation methods are
probably obsolete.**



Regional headquarters: 6549 W. North Ave., Oak Park, Illinois 60302/3339 Temple St., Los Angeles, Calif. 90026

Communications

Modem Can Use Poor Channels

WATERTOWN, Mass. — Data can be transmitted effectively at 4800 bit/sec over unconditioned and substandard telephone channels, with the new Codex 4800 modem, according to Codex Corp.

At the same time, the company said that telecommunications users transmitting in the slower 50 to 1800 bit/sec range can use the Codex 800 asynchronous time division multiplexer to implement a fully expandable system at a cost previously said to be associated only with limited expansion frequency division techniques.

The Codex 4800 modem is available for \$5,575/unit. The cost of the Codex 800 multiplexer depends on the number and types of channels to be included, but is approximately \$400/channel, the company said.

Codex Corp. is at 150 Coolidge Ave.

Data Transmitter Reads Full Cards

MOUNTAIN LAKES, N.J. — A card data transmitter from Datron Systems, Inc. is described as going beyond the capability of the IBM 1001 Data Transmission Terminal, with which it is compatible, by adding the ability to read 80 columns of data per card.

Called the Model 102 Card Data transmitter, the device operates with the Bell 401 E2 data phone and can transmit through the use of translators to a key-punch, TTY, or any RS232 or EIA compatible device such as magnetic tape or printers.

It combines with its keyboard and the data phone or other interface to transmit data to the receiving station. The unit is priced at \$1,000 and leases for \$23/mo. Datron Systems Inc. is at 100 Route 46.

• Singer's System Ten. The computer that goes where the work is.

A computer on every desk. In shipping and receiving. In the stockroom. In billing. In payroll. In the Office of the President.

And in the budget.



It's the Singer System Ten. The computer that goes wherever your people need data processing, or you need data input. And it's designed to be understood and used effectively

by nearly everyone.

System Ten goes so much further and does so much more because we've designed it with seven important advantages especially for business applications:

1. The workstations can be located virtually anywhere in your office or plant.
2. The system can process up to 20 jobs simultaneously. Including batch processing. 20 jobs, no waiting.
3. The system has mass storage. 10K built into the CPU, expandable to 110K, and an additional 100 million characters is available with disc drives. Room for all.
4. Time-sharing control is built in with hardware. So no expensive executive software is needed.
5. System Ten uses simple assembler-

language programming. Anyone can do it.

6. Data communications capability to interface System Ten with other on-site or remote computers.

7. Total modularity, leading to remarkable cost economies. Total flexibility of size and configuration now, expandability for the future. For a new application, just add a new workstation.

In addition to these functional advantages, System Ten hardware needs only minimal environmental control. And the simple two-wire connections eliminate the need for expensive false-flooring to conceal heavy cable.

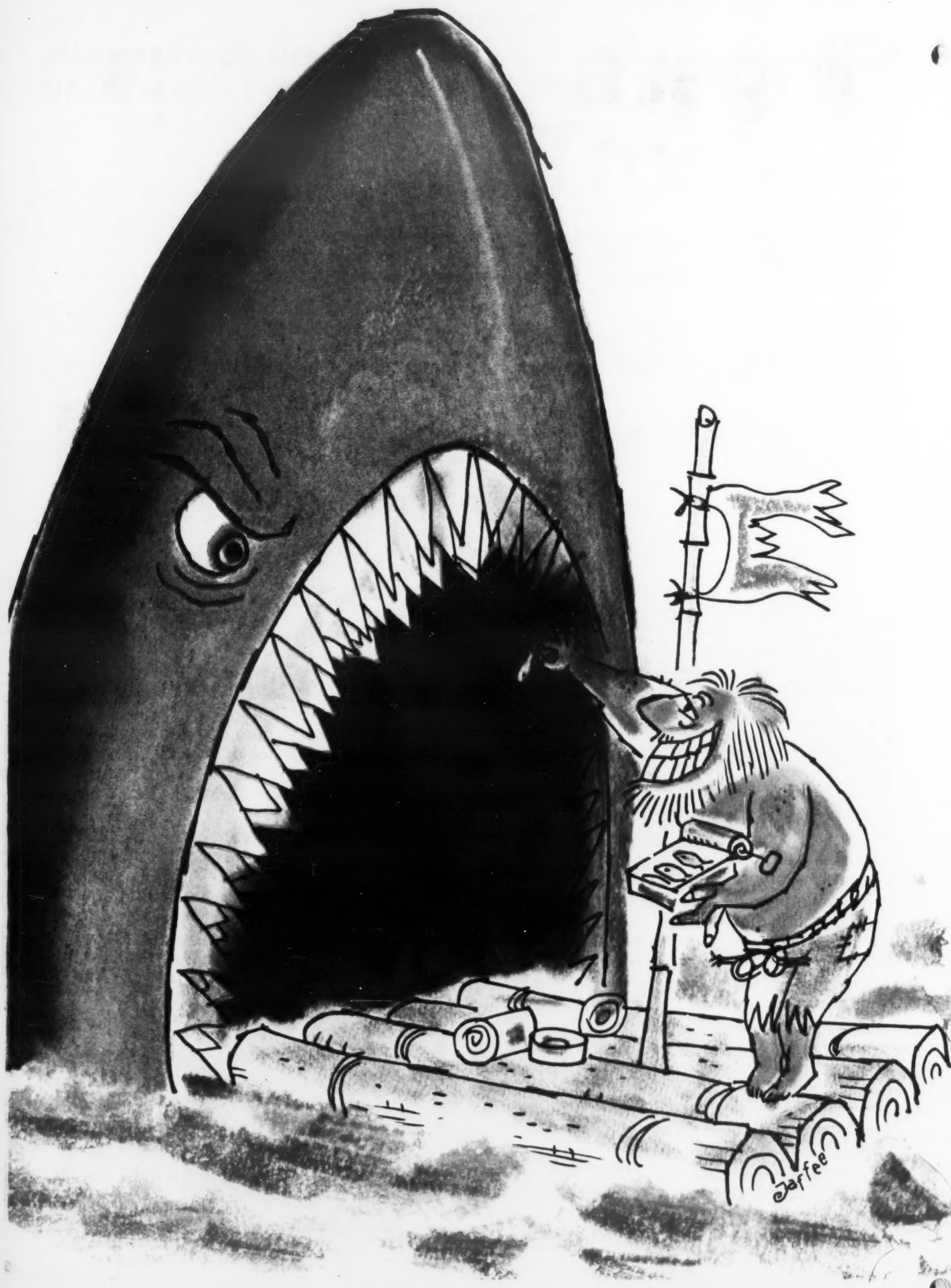
Find out more about the computer system of the decade. Call where the System



Ten people are, your nearest Friden office. Or write: Friden Division, The Singer Company, San Leandro, California 94577.

SINGER
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Hungry CPU?

A hungry computer can eat you alive without fast, efficient input.

That's why Inforex developed Intelligent Key Entry.TM

Inforex feeds hungry CPU's. It does electronically what other forms of data entry do mechanically.

The Inforex system gathers data from eight keyboards into one disc memory unit. Data may be sight or key verified. Built-in logic performs check digits, left-zeros and balance totalling. Jobs are pooled onto 7 or 9-track compatible tape. Optionally, it will operate on-line directly to your central processor.

Keypunch/verifier functions.

Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or - signing of fields.

Simultaneous entry and verification.

All eight keystations input to one disc memory unit. Each keystation is assigned an area as it enters. Any keystation can access any assigned area at any time.

Since each keystation has both sight and key verification capability, one keystation can verify work entered on another and if desired, verification can be done simultaneously with data entry.

Keyboard to tape functions.

Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs.

Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to

the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. And remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is \$50 per keystation. \$560 for control unit (up to 8 keystations). \$960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

"Inforex it."

Perot Named FJCC Keynoter

MONTVALE, N.J. — H. Ross Perot, internationally known businessman and philanthropist, will address the keynote session of the Fall Joint Computer Conference on Nov. 17, at 10 a.m. in the Grand Ballroom of Houston's Astro-World Hotel.

Perot, president and chairman of the board of Electronic Data Systems, a Dallas DP service organization, will discuss the conference theme, "Systems and Society."

His talk will consider the impact of current computer technology on society, and how future technological developments may affect sociological progress.

AMA Plans Four Seminars on EDP Systems in Finance

NEW YORK — The American Management Association has scheduled four seminars to promote the development of effective EDP systems in financial areas.

All the seminars will be held at the AMA headquarters here.

The seminar on Developing Computer Systems for Cost Accounting and Control, Oct. 19-21, will be chaired by C.A. Vobroucek, manager of costs and budget forecasting, Caterpillar Tractor Co.

The second seminar, Developing Computer Systems for Accounts Payable, Oct. 21-23, will be chaired by David Shefrin, executive vice-president and manager, software products division, CSEC. Various problems and benefits will be discussed.

Designing Computer-Based Accounting and Financial Informa-

tion Systems is also scheduled for Oct. 21-23, and will be chaired by Steve Ewing, secretary treasurer, Computer Guidance Corp.

The seminar on Developing EDP Systems for the General Ledger and Financial Statement Preparation will be held Oct. 26-28 and will be chaired by Alan Orlove and Jed P. Isaacs.

Orlove is manager of account-

ing development, Polaroid Corp.; Isaacs is with Brout, Isaacs, & Co.

for Computers and EDP Support Systems, led by Roy N. Freed, an attorney with Widett & Kruger.

Information may be obtained from Registrar, AMA, Inc. The American Management Association Building, 135 W. 50 St., New York, N.Y. 10020. The fee for each three day meeting for members is \$225; for nonmembers, \$260.

Societies

AMA has scheduled a special meeting Nov. 11-13, entitled How to Negotiate and Contract

Plastic Cards Topic at DPSA Meeting

STAMFORD, Conn. — "Data Input With Plastic Cards" is the theme of a seminar sponsored by the Data Processing Supplies Association (DPSA). Open to the interested public, the conference will be held at The Barbizon-Plaza Hotel, New York City, Dec. 1-3.

The program for the seminar will be composed of total systems presentations by plastic card and

related peripheral equipment manufacturers highlighting new trends in the industry and incorporating case-histories of applications.

The purpose of the seminar, according to co-chairmen Gene Garofalo and Bradley Norpell, is "to bring together all segments of the plastic card industry, and to provide presentations which define and clarify systems applications for data input with plastic cards."

Application Areas

The program is divided into seven categories based on major areas of application in the industry: banking, education, health/welfare, industrial petroleum, retail and travel and entertainment.

Bickford Henchey, director of automation, The American Banker's Association, will keynote the banking category.

J.L. Gotlob, assistant director of public services, Temple University, will discuss "The Plastic Card Goes to College" in the session on educational applications.

Stanley Sheppard, associate director, New Britain General Hospital, New Britain, Conn., is the keynoter for the health/welfare category.

Irving I. Solomon, vice-president/Information Systems Division, The National Retail Merchants Association, will be the speaker for the retail category. Other speakers will be announced in the future.

General Interest

There will be five presentations on topics of general interest: data communications, card encoding techniques, how cards are made, the plastic card and OCR, and "Standards."

Further information may be obtained from the Data Processing Supplies Association, 1116 Summer St., Stamford, Conn. 06905.

Confessions of a disk pack reject

"I'm good. I know I'm good. Almost everybody says so. And I was sure I could make it as an RCA Disk Pack.

"The 6-high RCA 506. Some of my best friends are 506s. And some are 11-high RCA 511s. For disk packs, either is a goal worth striving toward.

"Anyway, I thought I had it made when I started my

final physical at RCA. They checked my sense of balance. Went over my tracks. Examined the quality of my coating. Gave me the toughest mechanical and electrical tests in the industry.

"Those people don't miss a thing. I didn't even get to the final test, a chance to prove myself on a computer. Seems I had

a slight case of the run-outs.

"What's a disk pack to do? I'm good enough to be somebody else's disk pack. But all I want to be is an RCA 506. And if I were 11-high, I'd want to be a 511."

Nobody needs a reject. Write RCA Magnetic Products, 201 East 50th Street, New York 10022.

Our disk packs make it.

RCA Disk
Packs



Calendar

Oct. 18-20, Chicago — 5th Annual Digitronics Users Assoc. (DUA) Meeting and Seminars. Contact: Digitronics Users Assoc., P.O. Box 113, Albertson, N.Y. 11507.

Oct. 19-20, Dallas — Second ACM South Central Region Computer Conference. Contact: Dr. B.L. Turlington, Exhibit Chairman, Computer Science/Operations Research Center, Southern Methodist University, Dallas, Texas 75222.

Oct. 19-21, Los Angeles — 11th American Meeting of the Institute of Management Sciences (Tims). Contact: Eugene Saxby, Security Pacific National Bank, P.O. Box 2097, Terminal Annex, Los Angeles, Calif. 90054.

Oct. 26-28, New York — DPSA presents I.O.S. (Input/Output Systems) Seminar 70. Contact: Data Processing Supplies Assoc., 1116 Summer St., Stamford, Conn. 06905.

Oct. 26-30, New York — Business Equipment Manufacturers Assoc. (Bema) 12th Annual Business Equipment Exposition. Contact: Timothy G. Donovan, Bema, 1828 "L" St., N.W., Washington, D.C. 20036.

DP Courses Available at Universities

The University of Massachusetts Amherst electrical engineering department has initiated the first undergraduate program at the campus devoted to modern computer technology, a four-year undergraduate program leading to a B.S. Degree in computer systems engineering.

The program is open to all students in the class of 1974 and engineering students in the classes of 1972 and 1973.

A grant of \$25,000 from the National Science Foundation with a matching grant of \$25,000 from the university will finance laboratory development for this new degree program.

Also, three noncredit correspondence courses on the effective use of computers are now available from the University of Wisconsin Extension Department of Business and Management.

The updated courses are designed to help businessmen gain a basic knowledge of how computers can be used, with little emphasis on quantitative meth-

Education

ods and statistics.

"Introduction to Managerial Data Processing" assumes no knowledge of EDP or mathematics, and provides managers with an understanding and working vocabulary of the ideas behind, potentials of, and limitations in EDP.

"Systems Analysis for Business Managers" offers a comprehensive view of how management can use the computer to develop and use systems for or-

ganizing business.

A nontechnical approach to management science techniques is given by "Management Science and Automatic Data Processing." The course covers influences of management science techniques upon the decision-making tasks, when combined with EDP methods and devices. It assumes only an elementary knowledge of algebra and a working knowledge of the functional areas of business.

More information and enrollment forms are available from Joseph L. Kleiner, Department of Business and Management, University Extension, 432 N. Lake St., Madison, Wis. 53706.

D.C. Students Take DP

WASHINGTON, D.C. — High school students here are preparing for possible future careers in data processing through a new curriculum developed under a grant from the National Science Foundation.

The grant of \$129,196 was made to the D.C. Public Schools to establish a data processing training facility at Ballou High School. The program was developed by the Anacostia Community School Project, an organ of the D.C. school system.

Designed to provide students with marketable skills, the curriculum will include courses in data preparation, machine operation, programming, and computer languages.

The various courses are planned so that a participating student from Anacostia or Ballou high school may terminate his studies at any of several levels and possess a marketable skill in the data processing field.

The program, which began this fall, is designed to offer courses in keypunch operation and introductory data processing.

Plato Is Moving, With NSF's Help

CW Midwest Bureau

URBANA, Ill. — A \$430,000 National Science Foundation (NSF) grant is beginning the third phase of a six-year program to take Plato (Programmed Logic for Automatic Teaching Operations) out of the university laboratory, where it was developed, and give it to the actual student in his own classroom.

The program began two years ago with an NSF grant of \$475,000 to the University of Illinois.

The third phase includes the installation of a high-speed computer capable of handling thousands of students with a response time of less than one-tenth of a second, building the first of a new type of student consoles, developing the telephone network for connecting the consoles to the computer and continuing development of instructional programs.

Each student will have a terminal and a CRT containing plasma panels, a new type of a flat, glass, display surface invented at the U. of I. Information from slides electronically selected with the console will be projected on the panel from the back. Students will put the 256-section slides into the console for use much as textbooks are used now.

Brooks to Speak At ACM Meeting

DALLAS — Rep. Jack Brooks (D-Texas) will speak at the Second ACM South Central Region Computer Conference scheduled for Dallas, Oct. 19-20.

Some 800 members of the Association for Computing Machinery's South Central Region, which stretches from Houston to Dallas, are expected to attend. Hosts for the meeting are members of the Dallas ACM Chapter.

Rep. Brooks, an 18-year veteran, will keynote the conference's Oct. 20 luncheon, to be held at the Marriott Motor Hotel.



Our Data Base seminar
could save you a lot
of running around.

If you're not using a data base now, you're most likely wasting a lot of your valuable time.

And it's because the Honeywell Institute of Information Sciences recognizes your need for more efficiency, to retrieve and manipulate data more quickly, that we are offering our special Data Base Seminar.

This seminar has been attended by representatives of more than 300 companies and has been conducted on-site at major corporations and government agencies.

For three days we'll teach you the latest Techniques of Data Base Structure and File Design. With heavy emphasis in the design of an integrated file.

Also a comparison of major data management systems will be presented and discussed. And you'll be provided with useful FORTRAN program listings as tools in applying file design techniques.

With all these advanced techniques you'll be able to begin designing file structures to accomplish your primary objectives.

Tuition for the entire program including luncheons and materials, plus the FORTRAN program listings, is \$300.00. Seminars will start promptly at 9am and continue until approximately 5pm each day.

If you can't make any of the seminars listed on our schedule, The Honeywell Institute of Information Sciences can arrange this Data Base seminar to be conducted "in-house" at special rates. Or you can purchase our video-taped version.

In any case, return the Data Base coupon below. Or call 617 235-7450, Extension 3181. It's a good chance to let your computers do all your running for you.

Manager of Seminar Programs / Honeywell Institute of Information Sciences
110 Cedar Street
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Yes... I am interested in attending the seminar checked below, and I would like further information.

☐ October 20-22, New York City ☐ December 1-3, Washington, D.C. ☐ December 14-16, Chicago
☐ November 16-18, Boston ☐ December 7-9, New York City ☐ January 18-20, Phoenix

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I would like more information about your:

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The Other Computer Company:

Honeywell

JCL Differences for OS Are Emphasized

By Ned Chapin

Special to Computerworld

System/360 Job Control Language by Gary Edward Brown, John Wiley and Sons, Inc., New York, 1970, 292 pages, \$7.95.

In computer facilities that operate in the open-shop style using IBM's 360 computers under OS (Operating System), the big trouble-maker is Job Control Language (JCL). Job Control Language causes more complaints from such users and results in more unsuccessful runs than any other single source of trouble. A book on JCL, therefore, should be welcomed by these computer users.

This book, read carefully and followed meticulously, should reduce the size and frequency of user problems with JCL. The book concentrates attention on

three types of JCL cards, the JOB, the EXEC, and the DD.

It also covers cataloged procedures, but far more briefly. Explicit attention is focused on differences observed under the Multiprogramming a Fixed number of Tasks (MFT), Multiprogramming a Variable number of Tasks (MVT), and Primary Control Program (PCP) varieties of OS.

For the convenience of the user, the book provides several quick reference aids to the parameters used on the JCL cards. This is a real help when the reader knows generally what he wants, but not how to say it in JCL. And the index is good.

One disadvantage is that the publisher did not use actual computer printout for the examples. Thus, the spacing and

appearance look strange, and require a mental translation.

The Theory Side

By Ned Chapin

Special to Computerworld

Automatic Syntactic Analysis by J.M. Foster, American Elsevier Publishing Co., Inc., New York, 1970, 65 pages, \$4.

For the software designer and programmer, here is a brief meaty introduction to some of the theory side of computer use.

The book concentrates on context-free grammars. It presents top-to-bottom and bottom-to-top parsing in an easily followed manner, and then moves briefly into precedence grammars.

Ned Chapin is a data processing consultant in Menlo Park, Calif.



COMPUTERWORLD

book reviews

Linear Control Theory May Reduce Programming

By Paul F. Hultquist

Special to Computerworld

Computer Programs for Computational Assistance in the Study of Linear Control Theory, by James L. Melsa, McGraw-Hill, New York, 1970, 129 pages, \$3.95.

Linear control theory, largely developed since World War II, is a well understood discipline that has been reduced to engineering practice. Nonlinear controls are currently in a stage of research and development and much of the present-day design effort is carried out on the computer.

Linear control design is likewise becoming computerized, not because of the intractability of the mathematics, but in order to avoid the computational drudgery.

Large linear systems are commonplace design tasks and computational aid, such as is offered in this book, is invaluable in reducing costs, saving time, and doing a better job.

This book was written by Prof. Melsa of Southern Methodist University to aid his students in control system theory.

The book contains an outline of the material covered, a description of the I/O formats, and an explanation of conventions used.

A set of five programs useful in state variable formulation of the control problem is described. These include basic matrix operations, response time program, graphical time response to arbitrary input (point plotting on the printer), sensitivity analysis, and a state variable feedback program in which controllability is determined and both open and closed loop calculations are made.

All programs are written in Fortran IV, and have sample input and output for small but typical problems.

Any computing facility serving an engineering group should find this book to be a good investment for its library.

It is not meant to be a text on linear control theory, and is likely to be incomprehensible to persons outside the field. But with an aid of this kind there is no reason to spend programming time on the vast majority of linear control problems.

Paul F. Hultquist is with the University of Colorado.

Logical Programming With System/360

By Ned Chapin

Special to Computerworld

Logical Programming With System/360 by John Wiley and Sons, Inc., New York, 1970, 579 pages, \$11.95.

This large book on Assembly Language, (7 by 10 inches in size and more than one-inch thick) is extensively illustrated. In addition to many full page illustrations, there is an average of two illustrations on the other pages. The publisher has reset all computer printouts into clean lines of type, with care to maintain a reasonable spacing.

The book's chapter titles range from "The Programmer and the Computer" to "The Operating System (OS) Access Methods."

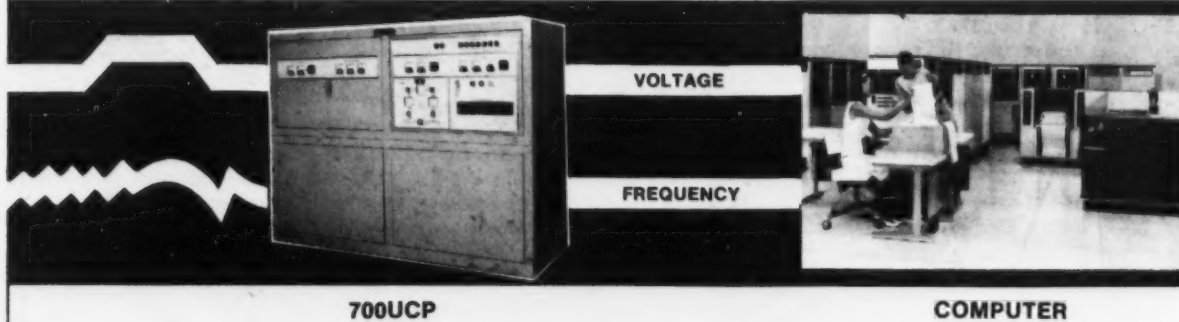
A great strength of this book is its unhurried pace. It takes the time to offer explanations, and does so without resorting to terse jargon. Mixed in with the discussion of the Assembly Language commands are some discussion of how they might be used. But the greatest value of this book is its illustrations. They are well done and deserve the reader's full attention.

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Hearings Scrutinize Private DP Schools

WASHINGTON, D.C. — Private schools, including those instructing EDP, came in for scrutiny last week by the District of Columbia's City Council Committee on Education which held public hearings to determine what types of regulation might be needed to protect the public.

According to committee chairman Joseph P. Yeldell, "Any person, with any qualifications, could establish any type of school within the District of Columbia tomorrow and not have to meet any standards of city law."

The hearings covered licensing of schools, bending requirements, standards of education and qualification of instructors and standards of advertising.

In testimony before the council, Charles Gold of Lear Siegler Institute argued that there

should be a difference in the leveling of bonds according to the size of the school.

Lear Siegler offers instruction in EDP and other unrelated subjects. Gold added, in regard to advertising, that regulation would be a benefit to all schools.

Nearby states do have private school regulations, Yeldell noted that the "Maryland State Board of Education supervises the operation of private vocational schools within the state and such supervision has cleansed that state of fraudulent operators."

"Soon, in Virginia, the state Department of Education will take over supervision of private schools and will move to set up rules and regulations governing their operation."

"Schools operating in Virginia must be licensed, post \$5,000

bond for every 50 students, and are required to meet standards of advertising," he said.

New Dimensions

DALLAS — A computer is helping a retail company design new outlets for its expanding chain of jewelry stores.

Zale Corp., whose 1,300 retail stores nationwide merchandise everything from jewelry to drugs to footwear, turned to the IBM 360/40 to free its architectural draftsmen from the need to repeatedly redesign the same buildings.

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Early Detection System for Cell Growth Advanced

CHICAGO — A major advancement in the effort to develop an early detection system for the identification of premalignant and early malignant tissue development in the human body has been made by medical researchers at the Pritzker School of Medicine here.

Using the taxonomic intracellular analytic system (Ticas), clinicians use a computer to differentiate between abnormal and normal cells that a single investigator, even if he were the most skilled and experienced, might never have seen.

Developed by Dr. George L. Wied, Ticas includes a fast-scanning microphotometer, a DEC Linc-8 computer, and an IBM 360/50.

The system distinguishes minute chemical and/or organizational deviations in the normal state of cells, be these produced by prolonged propagation in tissue culture as a cell line, by infection with viral agents, by drugs, by radiation, and by early changes connected with the potential for malignant growth.

Ticas "digitizes" the various densities and patterns of nucleic acid and protein distribution in each cell. The mathematical relationships of these densities are evaluated and correlated for each cell. Based on previous identifications performed by Ticas, particular relationships indicate the existence of abnormalities.

DP for Handicapped

WEST GERMANY — A research and development team at Volmarstein Orthopedic Institute is opening a modern, professional opportunity for physically handicapped children in data processing.

Currently, the team is experimenting with a specially built system enabling Thalidomide children to operate keypunching machines with their toes.

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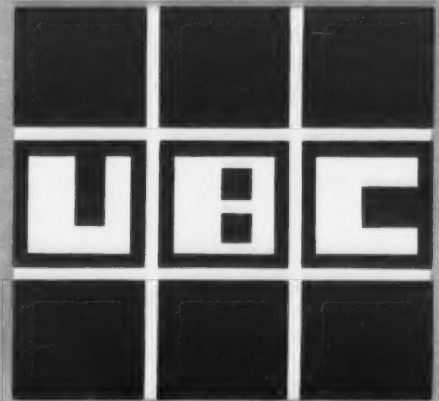
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Reservations Center Prefers 'Wet Look'

SAN DIEGO, Calif. — If Pacific Southwest Airlines (PSA) has a fire in its computerized reservations center, its computer system may get soaking wet. But airline officials are betting it won't happen unless fire breaks out in the computer itself.

"We looked into every type of fire protection system," said Albert R. Svahn, PSA's safety director, "wet pipe, dry pipe, high expansion foam, and CO₂."

PSA has a centralized reservation system, and the extinguisher system had to protect not only the computer and com-

puter room personnel but also 84 reservation clerks.

The problem wasn't simple to solve. Since CO₂ could injure the personnel and there is no way to control where foam is sprayed, Svahn said, water seemed the answer — if it could be controlled properly.

Water Damage

"With a wet pipe [fully flooded] system you are always taking a risk of water damage from a leak," Svahn said.

PSA finally chose a system made by the Viking Corp. of

Hastings, Mich., which is designed to prevent accidental leaks and to minimize water damage. The system, called Fire-cycle, sprays water only in the immediate area of the fire and shuts off automatically when the fire is out.

To prevent leaks, the pipes leading to the sprinklers normally are dry. If the heat in the protected area rises to 140 degrees, thermal sensors open two solenoid valves, indirectly opening a main valve that floods the pipes leading to the sprinklers.

When the temperature at any of the sprinklers reaches 212 degrees, the sprinkler opens and sprays the area beneath it.

When the room temperature drops below 140 degrees, a timer is activated that shuts off the water five minutes later. Continued protection is assured because the sensors can turn the water on again.

A backup battery power supply protects the system during power failures.

Mutual, I'm Sure

BERLIN — When Joachim Schapitz gave a party, his guests met new friends. Schapitz had devised a questionnaire and had given it to casual acquaintances to fill out.

The answers were run through a computer, which selected the 100 people most likely to get on well together.

Schapitz was delighted with the results: "Not everyone wants to find a partner for life by computer, but we all like a good party so long as we have something in common with the other guests."

Berlin tourist agencies plan to use a computer to organize party trips around the city.

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Due to increased circulation and the rising costs of production and distribution, COMPUTERWORLD will increase all advertising rates effective January 1, 1971.

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Contact your nearest COMPUTERWORLD sales office for complete information. Rate Card No. 6 will be mailed to advertisers on October 15, 1970.



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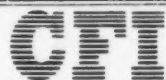
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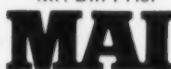
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Decision Data's System/3 Compatible Data Recorder

Decision Data 96-Column Card Machines Have Texas Instruments MOS Memory

WARMINSTER, Pa. — A series of 96-column card machines, including two data recorders, a sorter, and a card reader from Decision Data Corp., features a specially developed Texas Instruments MOS memory. The units are designed specifically for the OEM market.

The MOS memory, the company said, along with certain peripheral enhancements, allows operators to key data and manipulate cards at rates and quantities impossible with current IBM units, at a lower cost than the IBM machines.

Data Recorders

The basic data recorder, Model

9601, is System/3 compatible and is said to offer a number of additional features including blank card feeding during verification, plus and minus right justification, and fast card feed times.

Operator speeds for keypunching and verifying are said by Decision Data to be 20% to 30% faster than conventional 80-column equipment and offer corresponding savings in data preparation.

A more advanced model, the 9610 Interpreting Data Recorder, offers all of the 9601's features plus the ability to print on the card during keypunching and verification.

U.S. Calls 14 European Countries Good Markets in Export Drive

WASHINGTON, D.C. — The U.S. Department of Commerce has identified 14 European countries as good markets for U.S.-manufactured computer equipment as part of its new "Go Global" export drive [CW, Oct. 7].

The export program is aimed at identifying particularly lucrative overseas markets for U.S. manufacturers and involves in-depth market research on the part of

the Commerce's Bureau of International Commerce.

Fourteen European countries were singled out as good opportunities to U.S. exporters of computer equipment.

Austrian Market

Austria — The Austrian market will double by 1975 when it will be importing about \$10 million worth of equipment. The U.S. is expected to keep about 15% of the market, being beaten by Germany and closely followed by the UK.

Products with the highest potential include small- and medium-sized machines, printers, keyboard teleprinters, reader punches, OCR equipment, terminals, and disk files.

Belgium — U.S. exports to this market are expected to triple by 1974. The U.S. is the leading source of equipment with a 22% share valued at \$7 million. Best prospects include large systems, key-to-tape devices, disk pack drives, OCR devices, and data terminals. Manufacturing industries account for most of the equipment demand.

France Supplies Denmark

Denmark — The Danish market for imported equipment will grow at a 20% rate per year up to 1975 with the U.S. holding a 20% share of the market.

France is the major supplier and the U.S. is followed closely by Germany and the UK. Best markets are for small computers, data transmission equipment, information display equipment, and disk memories. Airlines, newspapers and railroads are seen as receptive buyers.

Finland — The U.S. will control about 25% of the imports to

Finland between 1970 and 1974, when the market will be valued at \$21 million.

Highest sales potential is predicted for data transmission equipment and process control systems, while good chances are projected for mass memories, small computers, and graphic storage and retrieval systems.

France — The French will import \$264 million worth of equipment in 1974 with the U.S. accounting for about 30% of the imports.

The U.S. products with the highest degree of success include large computers, OCR equipment, key-to-tape devices, and direct access storage systems. Custom software is also a good market especially in the scientific and engineering regions.

Germany Big User

Germany — Called the second largest computer user, Germany imported \$70 million worth of equipment from the U.S. last year and will import equipment valued at \$150 million in 1974.

The U.S. was second to France in the import race in 1966, but has now become number one.

Good opportunities exist in small computers, process control, data transmission equipment, information display equipment, standard software packages and disk memories. Automotive aviation and banking industries are good prospects.

Italy — This market will have imports valued at \$73 million in 1974 with the U.S. share estimated at \$22 million. The U.S. products with the best chances for success include large and small computers, terminals, data transmission equipment, and

(Continued on Page 40)

U.S. Issues Proposal Bid To Furnish 372 Peripherals

WASHINGTON, D.C. — A Request For Proposal to furnish 372 IBM-compatible tape and disk drives as replacements or substitutions for currently installed or on-order IBM units in the Air Force, Army and seven other agencies has been issued by the Federal Government.

Most of the units are for the Air Force (278) and the Army (31). The other agencies include the Railroad Retirement Board (24), Post Office Department (2), Office of Economic Opportunity (6), Securities and Exchange Commission (2), Commerce Department (2), Government Printing Office (19), and the Defense Communications Agency (8).

Models to be replaced include IBM 2311, 2314-1, 2314-A1, 2314-A2, 2401-1, 2401-2, 2401-3, 2401-5, 2401-6, 729-2, 729-4, 729-5, 729-6 and 2420-5. The systems are to be delivered through next June 30. The deadline for submission of proposals is Nov. 2.

The AF procurement covers 17 Model 2314 disk drives; five 2311 disk drives; one 2401-1 tape system; 96 Model 2401-2 tape systems; 84 Model 2401-3 tape systems; 25 Model 2401-5

tape systems; 30 Model 729-2 tape units; five 729-4 tape systems, and 15 Model 729-5 tape units.

Several AF 2314s are model A1. The equipment will be installed at various locations around the country.

The Army will procure replacements for eight 2401-2s; seven 729-4s; seven 729-5s; seven 729-6s, and two 2314s, also to be installed at various facilities.

The Defense Communications Agency is seeking five 2410-6s; one 2314-A1, and two 2401-3s, all for installation in Washington, D.C. The Railroad Retirement Board plans to procure four 2401-3s, one 2401-6, 17 Model 2420-5s, and two 2314-A1s, all for use in Chicago.

The Post Office will replace two 729-5s in Atlanta; OEO, one 2314-A1 and five 2401-3s in Silver Spring, Md.

The SEC and Commerce Department will each procure two 2311s for use in Washington. The GPO is seeking eight 2401-2s, eight 2401-3s, and three 2314-A1s, for installation in Washington. GSA estimates that contract awards will be made about Nov. 20.

Price for the 9601 is \$5,900 and \$7,400 for the 9610. Quantity discounts are available. Customer deliveries of the 9601 will begin in December 1970 and the 9610 in March 1971.

1,500 Card/min Sorter

Decision Data claims that its users can sort 96-column cards 50% faster than with current System/3 equipment. The 9620 is said to sort the full 64-character set at a rate of 1,500 card/min.

Unlike the six-pocket IBM 5486 sorter, the 9620 has 11 pockets and sorts numeric data with one pass/card column, the company said.

Alphabetic sorting with the 9620 takes 1-2/3 pass/card column for alpha sorting. The effective speed of alpha sorting is 900 card/min vs. 750 and 500 card/min on the IBM 5486.

Purchase price of the 9620 is \$5,600, with discounts available. Initial customer deliveries will begin in June, 1971.

Two models of the 9630 card reader are available. The 9630-01 includes interface electronics, power supply, and compatibility connectors specifically designed to interface with the multiplexer channel of the IBM 360/25 and up.

Software is optionally available. The 9630-02 is a tabletop unit for OEM use with basic controls and buffer memory, permitting easy interface into a variety of computer systems, the company said.

The 360 version of the reader is priced, the company said, about \$9,000 less than the comparable 80-column 360 reader. It is equipped with a 2,000 card input hopper and three 1,200 card stackers positioned at the same height. The controls, similar to those of the IBM 2501 in function, are positioned at eye-level.

List price of the 9630-01 is \$5,800 and 9630-02 is \$4,500, with quantity discounts available. Customer deliveries began this month, the company said.

Decision Data Corp. is at 300 Jacksonville Road.

ADL Sees \$2 Billion Drop In '70 Computer Shipments

NEW YORK — An advance report on an Arthur D. Little study of the computer industry says that 1970 general-purpose computer shipments "will be somewhere between \$3.5 and \$4 billion," down drastically from \$5.5 billion in 1969.

The report, to be completed in December, also estimates that 1969 shipments were down \$100 million from \$5.6 billion in 1968.

Frederick G. Withington, speaking for ADL, said that because of the rental backlog the drop in new shipments won't hurt the "immediate earnings for the likes of IBM . . . But if the industry doesn't recover, there will be a very severe impact in future years."

'Significant' Upturn

The ADL report, however, pre-

dicted "an upturn of significant dimensions in 1971, becoming more pronounced in '72." Withington said he expected IBM to ship more than \$10 billion worth of 370s in the next four years, predicting that this will mean a net increase in installed base for IBM of from \$4 billion to \$6 billion.

The ADL researcher listed four causes for the drastic drop in new computer shipments. First he blamed the "severe depression" in the R&D and aerospace industries.

This, combined with the general recession, "has caused a lot of people to postpone shipments of their computers."

He also noted that many orders had been delayed in anticipation of the new mainframes just now being announced.

(Continued on Page 40)

European Countries Listed as Good Markets in Drive

(Continued from Page 39)
disk memories, which in aggregate will account for about 65% of the imports from the U.S. in 1974.

Government, banking, manufacturing and the process industries are the best buyers.

The Netherlands - Imports of equipment will be valued at \$65 million in 1974 out of a total market valued at \$96 million. The U.S. presently controls about 30% of the imports and is expected to keep the lead.

Potential sales are seen in all sizes of computers, disk files, key-to-tape equipment and data terminals. The best markets are in government, universities and banking.

Norway - Imports will be valued at \$27.9 million in 1974

with France presently holding the edge and the U.S. in the number two position.

Products with the highest potential are small computers, disk drives and packs, magnetic tape drives, OCR equipment, data transmission equipment, magnetic tape encoders, and selected software and services. Service bureaus, government and communications are the leading users.

Spain Depends on U.S.

Spain - Spain will have a \$56 million EDP market in 1973, with 95% coming from imports and the U.S. supplying equipment valued at \$16 million.

Highest potential is seen for small and medium computers, data transmission equipment, in-

formation display equipment, magnetic tape encoders, and disk memories.

Sweden - U.S. exports to Sweden are expected to reach \$30 million by 1973 out of a total market projected at \$112 million.

The best chances for business are seen for manufacturers of small and medium systems, data transmission equipment, information display equipment, computer typesetting systems, and disk memories.

Switzerland - The U.S. presently has 30% of this market, which is estimated at \$57 million in 1974.

Manufacturers of information displays, OCR equipment, terminal systems, magnetic tape recorders, paper tape readers, and

offline printers are seen with the best chances of success in the market. Machinery, banking and trade are the best markets.

United Kingdom - Large and small computers, large capacity disks, disk drives, data transmission equipment, CRT displays, storage and retrieval systems, and plotters are considered the best prospects in this market which will import equipment valued at \$650 million in 1975. The U.S. controls about 65% of the imports.

Yugoslavia - This country will import equipment valued at \$45 million in 1974 with U.S. imports amounting to \$28.3 million. Small- and medium-size computers, process control equipment, data transmission equipment, CRTs, OCR equip-

ment and punched card equipment are the best prospects.

Fully detailed reports are available from the Bureau of International Commerce in Washington, D.C., at 10 cents per copy.

ADL Predicts Substantial Drop In '70 Shipments

(Continued from Page 39)

Withington's final cause was the difficulty users are having developing large-scale applications. He said that while many companies want integrated total management information systems, "almost to a man they have found that these are far more difficult to develop than anticipated - taking two to five years longer to implement than planned." As a result, equipment orders have been pushed back several years.

User Needs

Predicting the general trend of the industry, Withington said that there will be greater orientation toward filling user needs rather than developing technically advanced equipment.

He claimed that what most users want - and what they are willing to pay for - is more convenience; he mentioned simpler languages for maintenance, easier means of debugging and emulating, and greater convenience in operation.

He also mentioned requirements for better accounting methods and increased reliability.

On the technological side, Withington discussed the difference in approaches between RCA's virtual memory and IBM's large-scale real memory. He pointed out all the new machines have "instruction execution times... in the order of 100 or 200 nsec now, rather than in the neighborhood of a microsecond. It's as if we suddenly broke out of a time plateau."

Joint Dropouts Cite Reasons For Withdrawal

HOUSTON - The old philosophy of everyone meeting in the middle doesn't work in a sagging economy.

Several of the fifty-plus dropouts from the Fall Joint Computer Conference told CW that neither the East Coast nor West Coast market could be expected to attend in full force.

Some dropouts, notably OEMs, stated they consider the JCCs as OEM shows and, in some cases, were attending only "because our competition will be there." Others decided to cancel because of business slowdowns and the unlikelihood of making any sales.

Despite Afips' contention that the JCCs are not sales expositions, practically every manufacturer contacted admitted that a predicted decrease in attendance, and consequent lessening of sales potential, was a determining factor.

Is it true what they say about COMPUTERDAILY?

Don't ask us. Ask them:

"I must keep up with events on a day-to-day basis, and I can't waste time searching for the information I need. Computerdaily allows me to keep up to the present in minimum time." -- R.W. Clarke, president, Data Action, Minneapolis.

"Computerdaily keeps me ahead of events in the computer industry. It's must reading every day." -- Ralph Johnson, president, Computer Network Corp., Washington, D.C.

"I like something on a daily basis. It keeps names in front of me, and some of the transactions that happen appear in Computerdaily long before the other publications come out." -- John H. Smith, president, Computer Leasing Co., Arlington, Va.

As you can see, Computerdaily is not a typical newsletter. First of all it focuses on the events important to the decision-makers in the computer industry -- and it interprets these events for them every business day. Computerdaily does not rehash press handouts; it sends reporters into the field to dig for the news.

Because Computerdaily takes this approach, it can provide you with information that will keep you in the know about the computer industry. It can help you save money, spot investment opportunities, sales leads and keep you abreast and ahead of developments within the industry.

To introduce you to Computerdaily, we're offering a one-week free trial subscription.

Just fill in the coupon below and mail it to our office in Washington, D.C. You will receive five free issues with the understanding that there's no obligation on your part.

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Please enter my subscription for:				
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If the new PDP-8/e is so great, how come it's so cheap?



We've got the price down under \$5000 for the basic 4K computer. (With teletype, under \$6500.) And our new modular design means that you don't have to pay for anything you won't use. The peripherals, the options, even the CPU, all plug into the OMNIBUS™. In any order. Buy only what you need for your application. Expand later if you want.

And you don't have to spend any time or money to debug the

software. 7500 other PDP-8 family computers have done it for you. The PDP-8/e is completely compatible with all the lovely software that's working right now in laboratories and factories, steel mills and power plants.

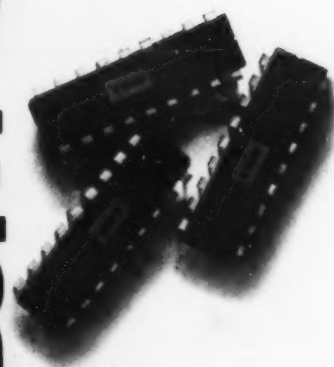
The PDP-8/e is made by the most experienced company in the small computer field. That's why it's such a great mini-computer. And that's why it costs so little.

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COMPUTERS MODULES

Digital Equipment Corporation
Maynard, Mass. 01754 (617) 897-5111

THE END

**CORES LOSE
PRICE WAR
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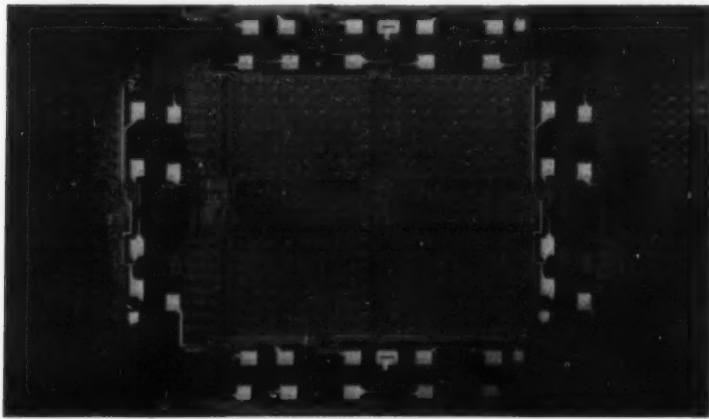
Intel introduces Type 1103, a history-making 1024-bit RAM made by our silicon-gate MOS process at such high yields that the cost dips below cores.

Just tell us what core memories cost you, and we'll tell you how to build operational Type 1103 memories for less cost in any size from 50,000 bits to 10,000,000 bits.

The Intel 1103 makes a fully assembled memory system that has a maximum access of 300 nanoseconds and a total cycle time of 600 nanoseconds. The chip is fully decoded and dissipates only 100 microwatts per bit, permitting dense packing in compact configurations.

For proof of the cost advantage, phone your Intel representative or call us collect at (415) 961-8080. For immediate delivery phone your local Intel distributor, Cramer Electronics or Hamilton Electro Sales. If your distributor isn't stocked, call Intel collect for immediate same-day shipment.

Intel Corporation is in high-volume production at 365 Middlefield Road, Mountain View, California 94040.



intelTM
delivers.

Mini-Comp Business System Gives Aid To Hospital Staff

NATICK, Mass. — A computer system dedicated to providing assistance to hospital administrators in conducting day-to-day business and in improving the utilization of personnel, facilities, and other resources is available from Mini-Comp, Inc.

Known as the "Administrator," the turnkey system is based on a Honeywell H316 computer that can be equipped with from 4K to 16K of memory. Other equipment used in a typical configuration might include a Synerdata keyboard printer and line printer and a two-spindle cartridge disk drive.

The Mini-Comp system is described as a "business system" capable of performing accounting, budgeting and forecasting tasks, and of accumulating and analyzing operational statistics.

Most, if not all, routine clerical and bookkeeping tasks, the company said, can be transferred to the system quickly and easily. These include: patient lists, bed assignments and transfers and scheduling of operating rooms, laboratories, radiology, out-patient clinics, staff and services.

According to Mini-Comp, the same data can be manipulated in several different ways to derive operating information. The "Administrator" is said to make it a simple matter to accumulate, classify and interrelate information and to issue appropriate reports.

In addition to the equipment described, other peripherals including card equipment, paper-tape equipment, magnetic tape drives, and plotters also can be connected.

The price of the "Administrator" in its basic model and including software is about \$700/mo and it is immediately available.

Mini-Comp is at 2 Mercer Road.

DEC Data Acquisition, Control Subsystems Designed for PDP-8

MAYNARD, Mass. — Two data acquisition and control subsystems from Digital Equipment Corp. are intended for use with the DEC PDP-8 in a variety of industrial and laboratory applications involving low-level analog signals or discrete digital I/O information.

One of the units, the UDC8, is a digital input/output subsystem that can interrogate or drive, DEC said, as many as 3,072 digital points, such as limit switches, contact closures, relays, operators' panels and alarms, or 256 directly addressable 12-bit, digital sense and control modules.

The UDC8 is described by DEC as a real-time device containing an internal interrupt structure that can locate an interrupting functional I/O module in typically five μ sec.

Input change of state and direction is determined by hardware gating. Both features are hardware implemented.

Base price of a minimum UDC8 is \$3,500 plus the functional I/O modules selected. Modules vary from \$120 to \$480.

The other subsystem is an analog unit, the AFC8, which multiplexes up to 1,024 differential input signals, performs gain selection and provides a 12-bit analog-to-digital conversion at a 200 channel/sec rate.

Three signal conditioning modules and eight program-selectable gains allow the AFC8, DEC said, to accept and intermix a wide range of signals and current inputs.

It is designed for low-level analog-to-digital applications in the range, but can condition signals of up to 100 V.

A typical fully implemented AFC8 of 128 channels is priced at \$13,200.

New OEM Products

Sylvania Storage Tube Retains Image

SENECA FALLS, N.Y. — The Electronic Tube Division of Sylvania Electric Products Inc. has developed a new 1.5-in. diameter storage tube for video storage, computer output buffers, and information processing systems.

The tube utilizes a monolithic-silicon-array target which provides resolution better than 1,000 lines, and retention times in excess of 12 min., for gray scale and over one hour for black and white. Images can be held for more than a week with the beam turned off.

Designated type SP5105, the outstanding features of the tube stem from the unique construction of the silicon mosaic target. The storage target is a silicon wafer containing a mosaic of insulating SiO_2 islands. A charge pattern — established on the islands during writing — is used to control the land-

ing of the primary beam current at local areas during reading.

Sylvania is offering immediate delivery on prototype quantities of the SP5101. The firm's address is 730 Third Ave., New York, N.Y. 10017.

Computer Test Shows Programmable Drives

CHERRY HILL, N.J. — Computer Test Corp. has introduced two programmable current drivers designed for use in special memory test systems, general purpose automatic memory test systems, and testing of non-memory components, such as non-linear ferrites, tapewound cores, and testing of MOS memories.

The Model 5561 (Positive) and 5562 (Negative) generators feature remotely programmable parameters such as pulse rise and fall times, pulse duration, pulse amplitude, and pulse position. The parameters can be programmed by digital

control in less than one μ sec, the firm said.

Computer Test Corp. is at 3 Computer Drive.

Auxiliary Module Provides Explanatory Captions

BROOKLYN, N.Y. — Caption modules provide flexibility to numeric readouts by displaying from one to six lighted areas either singly or in combination. Manufactured by Dialight Corp., they are designed to be customized with mathematical signs, symbols, or words.

The new 711 Series Caption Modules are fully compatible with Dialight's 710 Series Numeric Readouts. The lighted area may present a single message or it may be divided into 2, 3, 4 or 6 areas that are individually switchable. The back-lighted transparency is produced photographically from an original master layout.

Dialight is at 60 Stewart Ave.

Pssst...don't tell

17 Firms Issued Requests for Proposals To Modernize DP Equipment at Wimmix

WASHINGTON, D.C. — The Air Force has announced that requests for proposals (RFPs) have been issued to 17 companies for the replacement and modernization of data processing equipment used in the World Wide Military Command and Control System (Wimmix) and related intelligence data handling systems.

The Wimmix procurement has been plagued with delays and cutbacks since it was first announced more than two years ago, and recently [CW, Aug. 26] it appeared that the program was to be scrapped when yet another review was ordered by the office of the deputy secretary of defense.

Now proposals are due Feb. 1, 1971, and evaluation of the proposals is to be completed within approximately 90 days after receipt. The contract is expected to

be awarded in May or June 1971.

The Department of Defense will procure a minimum of 15 new standardized computing systems with an option for 20 additional computers during fiscal 1972-73 under the pact and it is planned that a minimum of nine systems will be ordered in fiscal 1972. Machine sizes will range from medium to large.

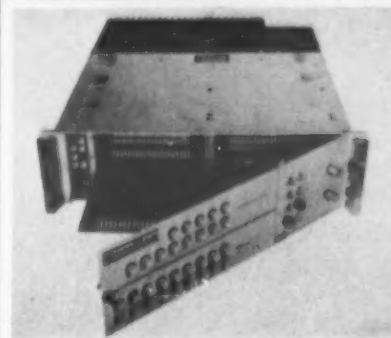
If proposals result in prices exceeding \$46.2 million from all proposers for the hardware and software for the 15 systems, the government may re-examine its requirements, restate such requirements, cancel or amend the solicitation and resolicit proposals for its requirements.

The procurement represents the first time the computing needs of command and control and intelligence users will be satisfied by machine systems acquired from a single source. Activities may tailor

the standard configuration to meet individual requirements with the winning vendor's equipment.

The AF Systems Command's Electronic Systems Division at L.G. Hanscom Field, Mass., is responsible for the selection of the ADP equipment and associated software. The General Services Administration will negotiate the contract and the joint chiefs of staff will be responsible for allocating equipment to users. The Defense Communications Agency is responsible for centralized software support.

The original Wimmix procurement had been slated as a \$250 million project calling for up to 87 standardized systems with the bidding open to independent peripheral manufacturers and software houses as well as the traditional computer mainframe manufacturers.



ComRac 1100 Memory

Information Control Memory System Has 900-nsec Cycle Time

LOS ANGELES — Information Control Corp. has announced a new mainframe core memory system, the ComRac 1100, which it claims is the smallest unit for its capacity now available. With the unit, cycle time is 900 nsec and access time is 350 nsec. All 1100s are delivered completely wired for 16K by 18 capacity which permits field expansion from 8K by 18 to 16K by 18 by plugging an additional 8K by 16 core stack and its associated circuit modules into the rack-mounted chassis.

The full 16K by 18 system requires only 5-1/4 in. of rack space, complete with power supply.

Aluminum Chassis

The system is constructed with a 1/8-in. milled aluminum chassis and card guides. It has a removable front panel to provide access to the circuit and stack assemblies which plug in horizontally from the front with all components facing upward.

All of the system's modules, including the stacks, are packaged as functional units which plug into a connector plate via a 104 pin, pin and socket connector. Each module has 18 test points.

Operating margins are guaranteed to be $\pm 5\%$ over the temperature range of 0-50°C. The 1100 features a $\pm 5\%$ margin switch. Typically used at the start of each day's operating, the switch is used to trigger a $\pm 5\%$ variation in the system's drive currents, thereby driving it to its operating margins and exposing marginally operating components.

Standard Features

Half cycle operation which allows the system to either read or write only at 600 nsec cycle times, and byte control, which permit selection of either the upper or lower 9 bits, are both standard features.

Operating temperature is 0°C to plus 50°C. Input power is 117 Vac $\pm 10\%$, 47-400 Hz.

Options for the 1100 include a built-in memory exerciser for completely testing the memory at 900 nsec.

Price is less than \$10,000 for an 8K by 18 with tester and power supply. Delivery is from stock.

ICC is at 9610 Bellanca Ave.

UCC 14-in. Plotters Complement GSD Line Of 30-in. Systems

DALLAS — University Computing Co.'s Graphic Systems Division (GSD) is now marketing a series of 14-in. digital incremental plotters. This 14-in. series complements GSD's present line of 30-in. plotting systems.

Designated Series 1430, the 14-in. plotters have factory selectable step sizes of .010 in., .005 in., .2mm or .1mm and operate at 300 step/sec (250 step/sec for .010 in. unit). The 1450 series operates on-line and is compatible with plotter interfaces designed for 200 or 300 step/sec operation.

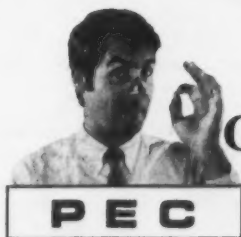
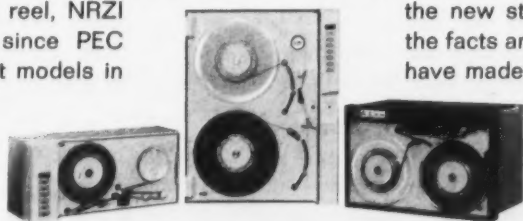
the big guys but PEC is bigger than they are in tape transports.

And now they're second sourcing us.

Who would have believed it? PEC's now NUMBER 1 in digital tape transports. Some of the reasons: Our digital transports cost less and work better. Less than \$3,000 buys a PEC 10 1/2 inch reel, NRZI synchronous transport. And since PEC makes more than 200 different models in 3 reel sizes, there's a wider choice of tape speeds (6.25 to 45 ips) and densities (200

to 1600 cpi). What's more, PEC's huge new plant means on-time, come what may, delivery. With features like these it's not surprising PEC's become the new standard in the industry. For all the facts and figures on the transports that have made us Number 1, write Peripheral

Equipment Corp., 9600 Irondale Avenue, Chatsworth, Calif. 91311, (213) 882-0030



"Visit us a FJCC '70. Booth 3016."

Okay, now you can tell 'em.

PEC



Take it.

The computer terminal that travels.

We did not build a portable CRT terminal to prove a point. We built it to satisfy the growing need of businessmen for access to a computer. In the office, in the plant, on the road.

To satisfy that need fully, we had to make our terminal a full-scale device. We had to make it reasonably priced. And we had to make it light enough to carry and rugged enough to take a beating.

Our portable is called Envoy. It plugs into an ordinary outlet, uses an ordinary telephone and has full editing controls. It is easy to use and it is compatible with Teletype* systems.

It has the best acoustic coupler on the market, one that virtually eliminates noise interference in data transmission. It has a solid-state keyboard and a commercially proven TV monitor. It displays either

*Registered trademark of Teletype Corporation

512 or 1,024 characters and displays them very clearly. And it has all the sophisticated operating features we developed for our large, stationary terminal.

It costs either \$3195 or \$3695, depending on character capacity and features. It weighs about 30 pounds and it fits under an airplane seat.

Now consider how it might be used:

By the time-sharing salesman to demonstrate his programs, routines and special languages.

By any salesman who needs information to close a sale, and needs it in the customer's office.

By the engineer on the job site.

By the scientist in the laboratory, by the programmer working at home, by the executive on a business trip.

It's worth considering.



Or leave it.

The computer terminal that stays put.

This is a desktop, stationary terminal called Consul. We designed it, engineered it and priced it to appeal to a broad cross section of the time-sharing market.

Consul lets you replace Teletypes with CRT terminals—plug to plug and with no changes in software.

But this terminal is capable of much more. It has the operating features that let you take full advantage of a CRT terminal and its inherent flexibility.

A formatting device, for instance, makes for fast, efficient data entry. The computer displays a form of fixed data. You fill in the blanks with variable data.

A look-ahead feature saves transmission time. It scans ahead and if there is no data on the rest of a line, the cursor goes directly to the next line. Which beats transmitting a lot of blanks.

Another point. You can use Consul in any of three modes—page, message and conversational. In the

page and message modes, you can edit a whole or a partial page of data before transmission. In the conversational mode, data simultaneously appears on the screen as it is transmitted. Also, you can correct mistakes in this mode without retyping the whole line.

Several other details. The terminal has a 12" TV monitor. It has a built-in modem (optional) that can operate as an acoustic coupler as well as via hardwire connection to a DAA. It has hard copy, cassette and graphics capabilities available as options.

Consul is available in three models. The Consul-800 displays 512 characters; the 840 displays 1,024; the 880 displays 1920 characters. They cost respectively \$2995, \$3495 and \$3995. Pretty reasonable considering the equipment.

But, then, there are a lot of new terminals on the market. And there have been a lot of claims. The only way to judge a terminal is to see it working.

We'll be glad to demonstrate the Consul in your office or ours; the Envoy anywhere there's a phone and an outlet.

ADDS
Applied Digital Data Systems Inc.

Mr. Richard Kaufman, Dept. 41
Applied Digital Data Systems, Inc.
100 Marcus Blvd., Hauppauge, N.Y. 11787 (516) 231-5400

- ☐ Please send me a brochure on the Envoy.
- ☐ Please send me a brochure on the Consul.
- ☐ Please have a salesman contact me.

Name

Company

Address

Tel.

City State Zip

See a demonstration at the FJCC

Acquisition System Converts Analog Data to Digital

CLEVELAND — A digital data acquisition system from the Brush Instruments Division, Gould, Inc., converts multiple analog inputs to digital format on magnetic tape for computer reduction.

The system includes the Brush 620 Data Logger and the Brush 622 tape reader. The 620 data logger accepts 18 channels of analog data which are sequentially sampled, converted to 4-bit BCD format and recorded on a 1/4-in. endless-loop tape cartridge.

Standard input is ± 1 V full scale with an accuracy of $\pm 0.1\%$.

The recording rate for all 20 channels is 2.4 scan/sec making possible up to 60 minutes of continuous recording on a single cartridge. Intermittent recording rates have a duration of from 3.5 hours at 10-second intervals to 1,800 hours at 1-hour intervals.

The tape reader accepts the data and plays it back from the cartridge for

computer data reduction and presentation.

Three data reduction modes are possible with the digital data acquisition system.

In the computer mode, the tape reader is connected through an interface card directly to the input bus of a standard computer. Standard plug-in interface cards are available for IBM 1130, DEC PDP/8-I, and Raytheon 703. Cards for other computers can be furnished on special order.

In the tape-to-tape mode, the tape reader feeds a 1/2-in. incremental tape recorder to produce a computer-compatible tape. And in the third data reduction mode, an interface card within the data logger furnishes digital output for a computer-compatible tape deck.

The Brush 620 data logger is priced at \$4,950. The Brush 622 tape reader carries a price tag of \$2,600. Optional accessories include an analog input expansion

unit, allowing the number of data inputs to be increased, priced at \$1,040; and the remote digital data input terminal, priced at \$155, which provides for entering one

channel of digital information into the 620.

The Brush Instruments Division of Gould, Inc. is at 3631 Perkins Ave.

Curry to Direct RCA MIS Program

NEW YORK — Bruce G. Curry has been appointed staff vice-president, management information systems programs of RCA.

In his new position, Curry will be responsible for the RCA management information systems program which services the data processing requirements of the company's divisions and subsidiaries.

This includes coordination of all internal business systems planning and development, procedures and records management, as well as business system consulting studies, and computers and corporate telecommunications.

Curry has been director, management information systems programs, since 1963, playing an important role in the development of RCA's internal data processing systems.

Other Moves

■ On Line Computer Corp. of Stamford, Conn., has appointed Louis Feldner vice-president of planning and systems.

■ Neil D. Morrison has been elected president of Spiras Systems, Inc. of Waltham, Mass., an affiliate of USM Corp.

■ James M. Taylor has joined Tracor Data Systems, Austin, Texas, as vice-

Executive Corner

president for engineering and product development.

■ Stuart Mabon, one of the original founders of Peripheral Equipment Corp., Chatsworth, Calif., has been promoted to executive vice-president of operations.

■ William N. Mozena and Graham Tyson have been appointed senior vice-presidents of Data Products Corp., Los Angeles.

■ John M. Price, general counsel and secretary of Boothe Computer Corp. of San Francisco, has been appointed vice-president.

■ IBM has announced the appointment of Dr. Ralph E. Gomory as director of research, succeeding Dr. Arthur G. Anderson who has requested a sabbatical year to spend as a visiting fellow at the Center for the Study of Democratic Institutions in Santa Barbara, Calif. Gomory will be responsible for IBM research laboratories in Yorktown, N.Y., San Jose, Calif., and Zurich, Switzerland.

■ William C. Kramp has been elected vice-president and controller of Recognition Equipment Inc., of Dallas.

■ Albert F. Wike, former Addressograph Multigraph director of corporate commercial development, will join Computer Entry Systems, Silver Spring, Md., as vice-president of corporate planning.

Raytheon Files Suit Against Intersil, Subsidiary, Workers

LEXINGTON, Mass. — Raytheon Co. has filed suit against Intersil, Inc. of Cupertino, Calif., Intersil Memory Corp., its subsidiary, and 14 employees of the Intersil group.

The suit seeks damages in the amount of \$1 million and punitive damages of an additional \$1 million for the misappropriation of Raytheon proprietary information relating to its semiconductor technology and the loss of semiconductor business.

The individuals named in the suit are Dr. Jean Hoerni, chairman of Intersil, Inc.; Marshall G. Cox, executive vice-president of Intersil, Inc. and president of Intersil Memory Corp., and 12 former employees of Raytheon's Semiconductor Division, in Mountain View, Calif.

Cox, who stated he felt the suit was unfounded and that Intersil was totally innocent of any wrongdoing, is a former marketing manager of Raytheon's Semiconductor Division.



Fall Joint Eye-Catcher.

Not every exhibit at the FJCC will get the attention it deserves.

But no matter how big the show is, or how small your booth, you can catch the eye of more than 35,000 paying readers in *Computerworld* each week. Every week. Before it all begins. So you'll stand out in the crowd, not just in it.

And when your ad appears in *Computerworld*, you'll also reach 18,500 Top Systems Executives. Better known as the primary buying influences of computer products and services who have up to \$10,000 in purchasing power on their own authority.

In addition to offering the highest all-paid circulation and lowest CPM of any computer publication, we'll be distributing 10,000 bonus copies of our special FJCC issues at our own booth. So you won't be lost in the crowd. Or lose your prospective customers on the floor.

Nov. 11th Preview Issue.

Color forms close Oct. 23
B-&W forms close Oct. 30

Nov. 18th Show Issue.

Color forms close Oct. 30
B-&W forms close Nov. 6

Start to build up your booth in our October 21 issue, and our October 28 issue, and our November 4 issue, and our November 11 issue. It'll pay off at Fall Joint with lots of special attention. Reserve your advertising space by calling the *Computerworld* representative nearest you.

62% of Subsidiary Pledged

Leasco Data Borrows \$40 Million From Seven Banks

NEW YORK — Leasco Data Processing Equipment Corp. has made two moves that affect its Reliance Insurance subsidiary.

The first move came when Leasco pledged 62% of its 97% interest in the insurance firm in

return for \$40 million borrowed for two years from seven banks, which it declined to identify.

The second came when Leasco repurchased some 400,000 Series B convertible preferred shares and 500,000 warrants for

\$32.8 million. The purchase was made from 29 private investors who had received the shares and warrants in connection with the Reliance acquisition.

Leasco said that the new funding will be added to \$25 million presently on hand and be used for operations of any part of the

around 38% of the Pergamon stock.

\$28.7 Million in Costs

In repurchasing the warrants and stock, Leasco paid a price that reimbursed the investors for costs totaling \$28.7 million, plus an amount related to the length of time they held the securities.

Last year Leasco repurchased a number of shares and warrants from the investors for a total price of \$31.9 million. A company spokesman said that the purchases are advantageous because they reduce the outstanding common stock.

The cumulative convertible preferred stock paid \$2.20 per share per annum and had a

liquidation value of \$55 when the offer was made. The warrants were for the purchase of a share of Leasco common at \$87 per share. The preferred stock was to have been convertible into Leasco common at \$90 per share.

In its 1969 fiscal year Leasco reported per share earnings of \$2.71 as against 1968's \$1.86 for a total income of \$43.9 million on sales of \$452 million. The 1968 figures were \$27.4 million and \$396 million.

In 1969 data processing accounted for \$101 million in revenues and \$10.1 million in income. Reliance Insurance accounted for 75% of the company's profits in 1969.

Chapter 10 Bid Denied, So CAI Seeks Liquidation

NEW YORK — Computer Applications Inc. will be liquidated.

The firm filed a voluntary bankruptcy petition that requests the courts to appoint a receiver to liquidate the company last week after a federal judge denied its request for reorganization under Chapter 10 of the Federal Bankruptcy Act [CW, Oct. 7].

The Chapter 10 petition would have allowed the company to stay in business under the direction of the court until it developed a plan to pay off its debts. Under the arrangement, CAI would have been protected from creditor claims while developing the plan.

However, Judge Sylvester J.

Ryan of the Southern District Court for the District of New York denied the Chapter 10 application because he found that it did not "comply with the requirements of Chapter 10."

The judge also charged that the petition had not been filed in good faith and said that it would be unreasonable for the reorganization plan to be put into operations.

Spokesmen for the firm indicate that they have been actively trying to sell subsidiary operations in order to raise the cash needed for debt payment, but that these efforts have failed.

At the same time, they said that the bankruptcy of the parent company would not affect the operation of such subsidiaries as E.B.S. Data Processing, Inc., and others in non-computer related areas.

E.B.S. is 82% owned by CAI and will continue to operate its service centers in seven separate locations. In 1969 the subsidiary had a volume of approximately \$12 million, with 30% of those revenues coming from the now discontinued CAI subsidiary, Speedata.

The discontinuance of the Speedata operation is considered the most serious setback for the firm. CAI had invested \$16 million in the subsidiary in its five years of operations. In addition, outside investors had provided a little over \$1 million to the Speedata service.

Finance

company other than Reliance.

It also disclosed that it would not use the funds for its planned purchase of Pergamon Press Ltd., a British publishing house that Leasco is trying to buy outright. Leasco presently holds

Honeywell, GE Layoffs in DP May Reach 700

BOSTON — The merger of the Honeywell and GE computer businesses has taken its toll of employees of the two firms.

Last week, the firms announced layoffs of computer personnel that could go as high as 700, with the Honeywell cutbacks coming among skilled engineers and research personnel and the GE slashes aimed primarily at hourly employees.

The Honeywell cuts, which will number 300, will come from its plants in Waltham, Billerica, and Framingham, Mass.

The GE layoffs will number between 300 and 400, the firm said, and will be primarily from operations in Phoenix, Ariz., and Oklahoma City.

Both firms said that they were making an attempt to absorb the laid off workers in other operations or to find them outside jobs.

Spokesmen indicated that these would be the last merger-related layoffs.

PDP-11 USER?

If you are now using a PDP-8 and would like to move up to a PDP-11, but are being held back by software conversion costs.

or you now own a PDP-11 and would like to utilize existing PDP-8 software.

then you need EMUL8, the only complete PDP-8 emulation package for the PDP-11. The EMUL8 system includes functions for loading, running, and debugging PDP-8 family programs on the PDP-11. For further information, write or call:

Gene Sengstock
CANBERRA INDUSTRIES, INC.
45 Gracey Ave.
Meriden, Conn. 06450
(203)-238-2351

Sperry Rand Gets Extension to Reply To Antitrust Suit

NEW YORK — Sperry Rand has received an extension of the September deadline for the company's reply to an antitrust suit which seeks to "unbundle" the Univac Division.

A reply is anticipated this week, according to Jack Berdy, president of the plaintiff, On-Line Software Inc., which seeks \$11.5 million in damages plus a separate pricing policy for hardware and software [CW, Sept. 9].

Banks Were a Day Behind

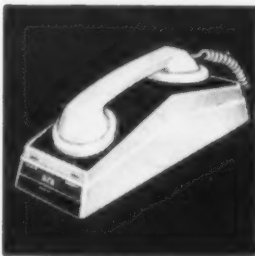
CHRISTCHURCH, New Zealand — A computer breakdown caused delays of up to a day in some business handled by trading banks in this area.

Because Christchurch did not have a backup system, some of the work was flown to Dunedin for processing. Checks had been processed, but printed reports and some customers' statements were delayed.

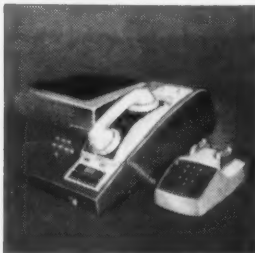
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\$180.00*

UNIT PRICE (ASK FOR QUANTITY PRICES)



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- PHASE LOCKED LOOP IC CHIP
- HALF & FULL DUPLEX ORIGINATE ONLY SWITCH
- UNITS OPERATE OVER 100-300 BAUD RANGE
- NO COSTLY HAND-TUNED LC CIRCUITS
- ULTRA SENSITIVE LOW NOISE INPUT CIRCUIT

PURCHASE ORDER

P.O. NO. _____	<input type="checkbox"/> 300S @ 200 ea. _____
CO. NAME _____	<input type="checkbox"/> 110T @ 200 ea. _____
ADDRESS _____	<input type="checkbox"/> FURTHER INFORMATION
CITY _____	<input type="checkbox"/> 300S CABLE (RS232)
ST. _____ ZIP _____	<input type="checkbox"/> @ \$10.00
AUTHORIZED SIGNATURE _____	<input type="checkbox"/> 300S CABLE (TTY)
	<input type="checkbox"/> @ \$10.00
	*PREPAID LESS 10% _____
	TOTAL _____

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A BOSTON COMPUTER Group company

Recognition Equipment, Beta Instrument Agree on COM Unit Sale, Joint Marketing

BOSTON — Beta Instrument Corp. shareholders have approved two agreements that could result in the firm becoming a subsidiary of Recognition Equipment Inc. (REI) within the next year.

One of the agreements calls for Recognition Equipment to purchase 100 COM systems from Beta between June 3, 1970 and Dec. 31, 1971 which includes all Beta COM systems under lease or on order as of June 3, 1970.

Recognition Equipment has the option to reduce the order to 50 units prior to April 1, 1971.

The second is a joint marketing agreement whereby Recognition Equipment has overall marketing and field service responsibility for the Beta Systems with specialized COM marketing support from the existing Beta sales organization.

Under this agreement, Recognition Equipment has received 100,000 shares of Beta common stock and a warrant to purchase 51% of the company any time prior to Dec. 31, 1971.

If the warrant is exercised Recognition will receive Class B stock, which has all the same voting and dividend rights as Class A.

MISSISSIPPI STATE CENTRAL DATA PROCESSING AUTHORITY

Advertisements for Bids
Sealed proposals will be received by the State Central Data Processing Authority, 508 Robert E. Lee Building, Jackson, Mississippi 39202, up until 10:00 a.m., Monday, November 2, 1970 for the following data processing service:

Request for Proposal No. 11 — Development of State of Mississippi Master Plan for Data Processing Activities
Request for proposal specifications may be obtained from the office of the State Central Data Processing Authority by sending a check or money order payable to "State Central Data Processing Authority", for twenty five dollars (\$25.00). This charge is made for the purpose of defraying advertising, reproduction, and distribution costs of the RFP specification.

Specifications may be reviewed at no charge in the office of the State Central Data Processing Authority between the hours of 10:00 a.m. and 3:00 p.m., Monday through Friday.

The State Central Data Processing Authority reserves the right to reject any and all bids and proposals that waive informalities.

STATE CENTRAL DATA PROCESSING AUTHORITY

Charles L. Guest
Executive Director
(October 14)

Acquisitions

Information Management Inc., San Francisco, a wholly owned subsidiary of Bergstrom Paper Co., has acquired La Prolle Associates, Ltd., a New York-based consulting firm specializing in data processing facilities. La Prolle Associates will operate as a subsidiary of Information Management Inc., which develops and markets proprietary software systems, and offers consulting and training regarding programming systems.

Com-Cir-Tek Inc., a computer service company, has acquired Par Industries Inc. Par Industries, manufacturer of printed circuit boards, will move into Com-Cir-Tek's headquarters in Cheektowaga, N.Y.

American Data Systems, Inc. (ADS) has become the principal

shareholder in Canoga Digital Systems. ADS manufactures computer-related equipment used in data communications; Canoga Digital Systems produces a dynamic digital analyzer used in design, development and testing of large- and medium-scale integrated circuits. Both companies are in Canoga Park, Calif.

First Data Corp., Waltham, Mass., has acquired the assets and ongoing time-sharing business activity of Codon Computer Utilities, Inc., also of Waltham. Codon Corp. will continue designing and developing software and special computer systems.

Automatic Data Processing, Inc. (ADP) has acquired Adaptive Systems, Inc. of New York City, a company specializing in a computerized employee evaluation service. The terms of the agreement call for Adaptive Systems Inc. to be acquired for an undisclosed amount of ADP common stock and accounted for on a pooling-of-interests basis.

AGS Computers, Inc., a new York software company, has purchased Duo Computer Corp., Bellmore, N.Y., from Administrative Systems Inc., Mineola, N.Y.

American Information Systems, Inc., Dayton, Ohio, has merged with Micro-Data Corp., a firm specializing in microfilm systems. The resulting company will specialize in all forms of information processing involving both computers and microfilm.

AVM Corp., manufacturer of mechanical voting machines, has agreed in principle to acquire Dahlstrom Manufacturing Corp. in exchange for about \$11.5 million of AVM's convertible preferred stock. The transaction is subject to the approval of Dahlstrom stockholders. Dahlstrom, based in Jamestown, N.Y., manufactures cabinets and other metal parts for the electronics and computer industries.

Some facts you must know before you choose an online savings and mortgage system.

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Card, Tape or MICR Input
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2980 Terminal Support
Multi-Drop Ability
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Certificates of Deposit
General Ledger
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Investor Reporting
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And more are on the way!!



Thirty-three highly skilled professionals provide the FDS "total support services" that include installation and training assistance, special modification service and continuing program and documentation maintenance. This unique staff is the key to our reputation for fine customer support and to future innovations that will keep the FDS system in its position of industry leadership.



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EDIP industry report

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617-969-4020



Computerworld Stock Trading Summary

All statistics
compiled, computed
and formatted by
TRADE QUOTES
Division of
National Information
Services, Inc.
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, OCTOBER 8, 1970

-----PRICE-----
E X C H
1970 CLOSE WEEK WEEK
RANGE OCT 8 NET PCT
(1) 1970 CHNGE CHNGE

SOFTWARE & EDP SERVICES

O ADVANCED COMP TECH	1- 6	2 7/8	- 1/8	-4.1
A APPLIED DATA RES.	4- 24	7 1/2	- 1/4	-3.2
O APPLIED LOGIC	2- 19	2	0	0.0
O ARIES	1- 8	2 7/8	+ 5/8	+27.7
A AUTOMATIC DATA PROC	23- 47	40 3/4	+ 7/8	+2.1
O AUTO SCIENCES	3- 14	6 3/4	+ 1/2	+8.0
O BRANDON APPLIED SYS	1- 9	1	- 1/4	-20.0
O COMPUTER AGE INDUS.	1- 3	2	+ 7/8	+77.7
O COMPUTER ENVIRON	3- 14	2 3/4	+ 1/4	+10.0
O COMPUTER INDUS.	2- 10	7	+1	+16.6
O COMPUTER NETWORK	3- 14	6	+ 1/2	+9.0
O COMPUTER PROPERTY	5- 15	6	- 3/4	-11.1
N COMPUTER SCIENCES	6- 34	12 1/8	-1 1/8	-8.4
O COMPUTER USAGE	2- 8	4 1/8	- 1/8	-2.9
A COMPUTING & SOFTWARE	16- 75	32 5/8	+1 7/8	+6.0
O COMRESS	2- 10	2 3/4	- 3/4	-21.4
O COMSHARE	3- 15	3 1/2	+ 1/8	+3.7
O CONSOL. ANAL. CENT.	1- 3	1 3/8	0	0.0

O DATA AUTOMATION	1- 24	2 1/2	- 1/4	-9.0
O DATA PACKAGING	5- 29	7 3/4	0	0.0
O DATAMATION SERVICE	1- 6	2 5/8	+ 1/2	+23.5
O DATATAB	5- 9	4 5/8	- 1/4	-5.1
O DIGITEK	2- 5	1 1/2	- 1/8	-7.6
O EDP RESOURCES	5- 13	9 1/4	+3	+48.0

A ELECT COMP PROG	3- 11	5 3/4	0	0.0
O ELECTRONIC DATA SYS.	31-161	63	0	0.0
O INFORMATICS	4- 21	8 5/8	- 1/8	-1.4
A ITEL	6- 26	13 3/8	-1	-6.9
O LEVIN-TOWNSEND SERV.	1- 13	3 1/2	- 1/4	-6.6
A MANAGEMENT DATA	8- 25	13 5/8	- 1/2	-3.5

O NAT COMP ANALYSTS	1- 8	2 3/4	- 3/8	-12.0
O NAT. COMP. SERV.	3- 12	5 1/2	+ 5/8	+12.8
N PLANNING RESEARCH	13- 54	22 5/8	-2 3/8	-9.5
O PROGRAMMING METHODS	9- 27	15	0	0.0
O PROGRAMMING & SYS	2- 5	2 1/4	- 1/4	-10.0
O PROGRAMMING SCIENCES	2- 33	2 1/4	- 1/2	-18.1

N SCIENTIFIC RESOURCES	2- 22	5 1/8	- 5/8	-10.8
O SOFTWARE SYSTEMS	1- 2	1 1/2	0	0.0
O TBS COMPUTER CENTERS	5- 27	5 1/2	0	0.0
O UNITED DATA CENTER	2- 4	3	0	0.0
N UNIVERSITY COMPUTING	14- 99	32 1/8	-1	-3.0
A URS SYSTEMS	5- 21	7 1/4	- 5/8	-7.9

O U.S. TIME SHARING	3- 14	6 1/4	0	0.0
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PERIPHERALS & SUBSYSTEMS

N ADDRESSOGRAPH-MULT	21- 62	30 7/8	- 3/8	-1.1
O ALPHANUMERIC	2- 15	5 7/8	+ 3/8	+6.8
N AMPEX CORP	13- 48	19 3/4	-1	-4.8
A ASTRODATA	4- 34	7 7/8	0	0.0
O BOLT, BERANEK & NEW	3- 11	8 5/8	+ 7/8	+11.2
N BUNKER-RAMO	6- 14	9 1/2	- 3/4	-7.3

A CALCOMP	11- 33	25 7/8	+5	+23.9
O COGNITRONICS	3- 13	9 1/4	+2 5/8	+39.6
O COLORADO INSTRUMENTS	4- 13	9	0	0.0
O COMPUTER COMMUN.	5- 36	11 3/4	+2 3/4	+30.5
A COMPUTER EQUIPMENT	4- 12	5 3/8	- 1/2	-8.5
A COMPUTEST	14- 28	18 3/8	- 7/8	-4.5

A DATA PRODUCTS CORP	5- 26	8 5/8	+ 1/4	+2.9
O DATA TECHNOLOGY	4- 23	5 1/4	+ 5/8	+13.5
O DIGITRONICS	4- 13	5	0	0.0
N ELECTRONIC M & M	7- 40	12 3/8	-1 3/8	-10.0
O FABRI-TEK	3- 8	4	0	0.0
O FARRINGTON MFG	2- 17	3 1/8	- 3/4	-19.3

O INFORMATION DISPLAYS	4- 20	8 7/8	- 3/8	-4.0
A MARSHALL INDUSTRIES	14- 67	27 3/8	-1 3/4	-6.0
A MILGO ELECTRONICS	15- 42	36 1/4	+2 3/4	+8.2
N MOHAWK DATA SCI	19- 87	35 3/8	-1 1/4	-3.4
O OPTICAL SCANNING	11- 52	19 1/2	0	0.0
O PHOTON	4- 17	10 1/4	+ 1/2	+5.1

O PHOTO-MAGNETIC SYS.	1- 4	1 1/4	- 1/4	-16.6
A POTTER INSTRUMENT	15- 42	21 3/4	-2 7/8	-11.6
O PRECISION INST.	6- 25	13 1/2	+1 1/4	+10.2
O RECOGNITION EQUIP	13- 83	20 3/4	- 1/4	-1.1
O REDCOR CORP.	4- 34	7	0	0.0
N SANDERS ASSOCIATES	7- 29	16 1/4	+ 1/4	+1.5

O SCAN DATA	6- 53	6 3/4	- 1/4	-3.5
N TALLY CORP.	10- 23	15 3/4	- 3/4	-4.5
N TELEX	10- 25	21 1/4	+2 1/8	+11.1
O VIATRON	2- 51	4 3/4	+ 1/4	+5.5

SUPPLIES & ACCESSORIES

N ADAMS-MILLIS CORP	8- 15	14	- 1/4	-1.7
O BALTIMORE BUS FORMS	9- 21	9 1/4	- 1/4	-2.6
A BARRY WRIGHT	6- 25	10 3/8	- 1/2	-4.5
A DATA DOCUMENTS	15- 35	19 1/4	-1 1/2	-7.2
N ENNIS BUS. FORMS	11- 19	12 1/8	- 1/2	-3.9
O GRAHAM MAGNETICS	5- 8	8	+ 3/4	+10.3

O GRAPHIC CONTROLS	7- 17	9 1/2	- 1/2	-5.0
N MEMOREX	46-166	83 3/4	- 3/4	-0.8
O 3M COMPANY	71-114	89 1/4	+2 1/4	+2.5
O MOORE BUS. FORMS	27- 38	32 1/4	- 1/8	-0.3
N NASHUA CORP	21- 43	31	+1	+3.3
O REYNOLDS & REYNOLD	25- 48	36 3/4	+1	+2.7

O STANDARD REGISTER	17- 30	19 1/2	- 1/2	-2.5
N UARCO	22- 39	28 1/4	+1	+3.6
A WABASH MAGNETICS	7- 30	11 1/8	-1 3/8	-11.0
O WALLACE BUS FRMS	25- 41	38	- 3/4	-1.9

-----PRICE-----
E X C H
1970 CLOSE WEEK WEEK
RANGE OCT 8 NET PCT
(1) 1970 CHNGE CHNGE

COMPUTER SYSTEMS

N BURROUGHS CORP	78-173	120 5/8	-2 5/8	-2.1
N COLLINS RADIO	9- 37	16	-2 1/2	-13.5
N CONTROL DATA CORP	30-122	48 3/8	+2 3/8	+5.1
A DIGITAL EQUIPMENT	50-124	80 5/8	-3 7/8	-4.5
N ELECTRONIC ASSOC.	3- 11	5 1/4	-1 7/8	-26.3
A ELECTRONIC ENGINEER.	3- 14	6 3/4	+ 1/8	+1.8
N FOXBORO	18- 39	25 1/2	-1 1/4	-4.6
O GENERAL AUTOMATION	9- 42	15 1/2	+1 1/2	+10.7
N GENERAL ELECTRIC	60- 86	85 1/8	+ 7/8	+1.0
N HEWLETT-PACKARD CO	19- 45	27	+ 5/8	+2.3
N HONEYWELL INC	65-152	85 3/4	-2 7/8	-3.2
N IBM	223-387	298 1/4	+1 1/4	+0.4

N NCR	30- 86	42	- 7/8	-2.0
N RCA	18- 34	26 1/2	+ 1/2	+1.9
N RAYTHEON CO	16- 33	23 3/8	-1 5/8	-6.5
O SCI. CONTROL CORP.	1- 8	3	+1 1/8	+60.0
N SPERRY RAND	19- 40	27 1/4	+1 1/4	+4.8
A SYSTEMS ENG. LABS	10- 49	19 3/4	-2 1/8	-9.7

N VARIAN ASSOCIATES	9- 29	15 3/4	- 1/8	-0.7
A WANG LABS.	18- 51	34 1/4	-2	-5.5
N XEROX CORP	66-115	87 5/8	+1 1/8	+1.3

LEASING COMPANIES

O BOOTHE COMPUTER	8- 25	13 3/4	- 1/4	-1.7
O BRESNAHAN COMP.	3- 9	3 1/8	- 3/8	-10.7
O COMPUTER EXCHANGE	2- 8	5 1/2	0	0.0
O COMPUTER LEASING	3- 18	3	0	0.0
N DATA PROC. F & G	6- 32	15	- 7/8	-5.5
O DATRONIC RENTAL	2- 8	4	+ 1/4	+6.6

A DEARBORN COMPUTER	10- 24	19	- 7/8	-4.4
O DIEBOLD COMP. LEAS.	2- 8	4 3/8	- 1/2	-10.2
A DPA, INC.	3- 10	5 1/2	+ 1/8	+2.3
A GRANITE MGT	7- 22	12 1/2	-1	-7.4
A GREYHOUND COMPUTER	5- 44	8 5/8	- 3/8	-4.1
N LEASCO DATA PROC.	7- 30	14 3/8	-1 3/8	-8.7

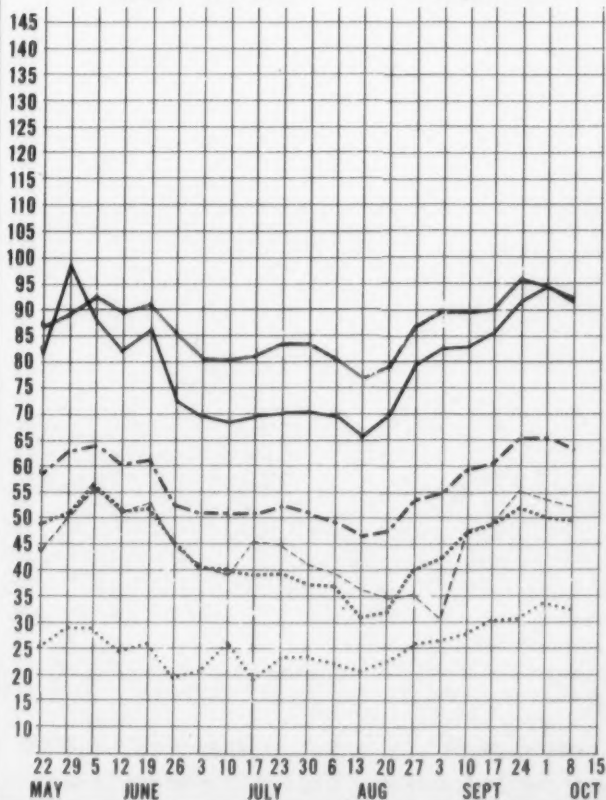
O LECTRO COMP LEAS	2- 9	3 5/8	0	0.0
A LEVIN-TOWNSEND CMP	3- 19	6 1/4	- 3/8	-5.6
O LMC DATA, INC.	1- 3	1 5/8	0	0.0
O MANAGEMENT ASSIST	1- 4	1 5/8	- 1/8	-7.1
O NCC INDUSTRIES	3- 8	4 5/8	+ 1/8	+2.7
O SYSTEMS CAPITAL	1- 8	3 1/4	- 5/8	-16.1

N U.S. LEASING	3- 19	14 1/4	- 3/8	-2.5
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EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

— Computer Systems — Software & EDP Services
- - - - - Peripherals & Subsystems - - - - - Leasing Companies
— Supplies & Accessories — — — — — CW Composite Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

AMPEX CORP. Three Months Ended Aug. 2			
	1970		1969
Shr Ernd	\$.05		\$.29
Revenue	64,528,000		68,558,000
Earnings	519,000		3,093,000

COLLINS RADIO Year Ended July 31			
	1970		1969
Shr Ernd	\$.15		\$.01
Revenue	349,000,000		400,000,000
Earnings	432,000		8,900,000

DPF&G Three Months Ended August 31			
	1970		1969
Shr Ernd	\$.40		\$.68
aRevenue	12,385,357		19,090,133
Earnings	1,626,419		2,312,044

TRACOR COMPUTING CORP. Three Months Ended June 30			
	1970		1969
Revenue	\$1,972,000		\$1,872,000
Spec Chg	a146,000		b197,000
Loss	1,033,000		1,169,000

a-Loss on sale of land and buildings and anticipated loss on leases for excess space. b-Loss on sale of product division.

ENNIS BUSINESS FORMS INC. Three Months Ended August 31			
	1970		a1969
Shr Ernd	\$.18		b\$.25
Revenue	11,033,666		10,614,819
Earnings	431,663		593,062
c6 Mo Shr	.41		b.46
Revenue	21,928,849		19,568,945
Spec Cred		e60,543
Earnings	978,927		f1,145,062

a-Restated for acquisitions on a pooling-of-interests basis. b-Adjusted for 100% stock distribution in December 1969. c-Based on income before special credit. e-Proceeds from life insurance. f-Equal to 48 cents a share.

DATA-DESIGN LABORATORIES Year Ended June 30			
	1970		1969
Shr Ernd	\$.35		\$.32
Revenue	8,112,237		5,821,157
Earnings	386,745		342,729

CSI COMPUTER SYSTEMS Six Months Ended August 31			
	1970		1969
Shr Ernd	\$.02	
Revenue	727,331		\$489,580
Earnings	(Loss)		(Loss)
	10,410		(87,116)

ADVANCED SYSTEMS, INC. Three Months Ended June 30			
	1970		1969
Shr Ernd	\$.19		(\$.08)
Revenue	674,115		65,008
Earnings	(Loss)		(Loss)
	118,418		(48,921)

AUTOMATED MARKETING SYSTEMS Three Months Ended June 30			
	1970		1969
Shr Ernd	\$.33		\$.25
Revenue	3,284,008		1,654,637
Earnings	200,644		162,337

UNITED DATA CENTERS, INC. Six Months Ended June 30			
	1970		a1969
Shr Ernd	\$.08		(\$.05)
Revenue	1,386,423		865,347
Earnings	(Loss)		(Loss)
	67,891		(40,180)

a-Figures adjusted to eliminate loss from subsidiary sold December, 1969, and to reflect adjustments arising from year-end audit.

COMPUTER APPLICATIONS Nine Months Ended June 30			
	1970		a1969
Revenue	\$22,179,000		\$23,864,000
Loss	8,911,000		3,147,000
Spec Chg	d5,430,000	
Loss	14,341,000		3,147,000

a-Restated by company. d-Consists of gain on sale of EBS Data Processing Inc. common stock; loss on sale of wholly owned subsidiary; write off of deferred Speedata development costs and provision for loss on discontinued operations.

TELEDYNE INC.			
Three Months Ended July 31			
	1970	1969	
aShr Ernd	\$.50	\$.49	
Revenue	302,536,000	341,679,000	
Earnings	16,119,000	15,607,000	
a9 Mo Shr	1.50	1.41	
Revenue	933,997,000	951,385,000	
Earnings	48,475,000	43,103,000	



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